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Trends and Issues in the Highly Cited Research on Learning Disabilities: A Content Analysis 1975 - 2013

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Trends and Issues in the Highly Cited Research on Learning Disabilities: A Content Analysis 1975 - 2013

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Dedication

To Oliver, my brown-eyed friend, for writing every word with me.

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It is true. They say it will feel impossible until one day it's done; and it's true.
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Trends and Issues in the Highly Cited Research on Learning Disabilities: A Content Analysis 1975 - 2013

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This investigation examined the emerging trends and issues in the field of special education, especially as they relate to learning disabilities (LD) by analyzing the content of impactful, highly cited (100+) and potentially promising (25 to 90 citations) published literature. This content analysis used four scholarly journals including *Exceptional Children, Journal of Learning Disabilities, Learning Disability Research and Practice,* and *Learning Disability Quarterly*. These journals were chosen as they focused specifically on LD and included one broad, cross-categorical journal recognized for its impact in the field. The analysis spanned four decades, starting with the passage of PL 94-142 in 1975 and ending with publications current as of 2013.

Articles were indexed in a customized EndNote database and were coded to analyze the content, design, year of publication, citation count, and for patterns in disaggregation for participants with learning disabilities. In addition to analyses across topic and type, patterns in authorship were also reviewed. The most highly cited articles in the database were compared to previous analyses of seminal works in the field of special education, especially those with a particular focus om learning disabilities.

Results indicated patterns in article topic, with literature addressing reading as the most common across the database followed by special education service delivery, learning disability identification, mathematics, and behavior/ social emotional topics. Commentary papers made up the largest proportion of article type. Trends in both type and topic were frequently articulated and impacted by changes to education policy.

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CHAPTER I

Publications in scholarly journals are often viewed as one of the most significant resources special education researchers and professionals can access (Mastropieri et al., 2009). These articles often provide the foundation for textbooks, guide those who train pre-service teachers, and inform research aimed at building an evidence base for instructional practices (Gersten et al., 2005; Horner et al., 2005). In addition, scientific research and scholarly publications potentially influence policy (Gersten et al., 2005) in a way no other resource does.

During the last 40 years, the policies that guide the education of students with disabilities (Education for All Handicapped Children Act (EAHCA; PL 94-142, 1975), Regular Education Initiative (REI; 1986), the Individuals with Disabilities Education Improvement Act (IDEA; 2004), and the No Child Left Behind Act (NCLB; 2001) have evolved significantly (Hallahan, Pullen, & Ward, 2013). By mandating how (e.g., evidence-based practices, specially-designed instruction, tiered intervention systems, etc.), where (e.g., in the least restrictive environment, in inclusive settings, etc.), and who (e.g., highly qualified teachers) provides the education for students with disabilities, these policies have impacted almost every aspect of how special education services are delivered in today's schools. One of the best examples of this impact can be seen as a result of the reauthorizations of PL 94-142 (Courtad & Bakken, 2001).

The Impact of Policy

In 1990, PL 94-142 was renamed from the Education for All Handicapped Children Act to the Individuals with Disabilities Education Act (IDEA). The changes to the law included replacing the word "handicap" with the word "disability," the addition of autism and traumatic brain injury as eligibility categories, and the provision of transition services for all students (Courtad & Bakken, 2011). In 1997, IDEA was further reauthorized. This iteration saw that general education teachers have greater involvement in the individualized education program process and students with disabilities have increased access to the general education curriculum and high-stakes accountability measures (IDEA, 1997). In the most recent reauthorization of IDEA (2004), regulations were aligned with NCLB to increase high-stakes accountability measures for students with disabilities and emphasize the importance of evidence-based reading instruction, early intervention, and prevention (Fuchs, McMaster, Fuchs, & Al Otaiba, 2013). These regulations also paved the way for significant changes in how students with LD would be identified by allowing (and possibly encouraging) school districts to use Response to Intervention (RTI) or multi-tiered intervention models (Hallahan et al., 2013).

While the evolution of IDEA provides one example of how legislative change occurred in special education, IDEA was not the only law that made significant impacts. Three years before the 2004 reauthorization of IDEA, the Elementary and Secondary Education Act was amended and reauthorized as NCLB (Fuchs et al., 2013). At this time, educational reform efforts were directed squarely at accountability and instruction, primarily because of a growing national concern over the failure of schools to close the

achievement gap for at-risk students. Stagnant gains on national assessments also fueled the reform efforts (Fletcher, Coulter, Reschly, & Vaughn, 2004). Fundamental to NCLB was the requirement of implementation of scientifically based instruction, especially in the area of reading for struggling students (Fletcher et al, 2004). This emphasis on reading instruction was strongly influenced by Reading First which required scientific reading instruction based on methods from the 1998 National Research Council report (Preventing Reading Difficulties in Young Children) and the National Research Panel report on reading comprehension conducted in 2000.

The emphasis in the provision of high-quality reading instruction in NCLB and IDEA drew the focus of many researchers and professionals to the subset of students identified as LD (Fuchs et al., 2013). Research and reports on on reading instruction (NRP, 2000; President's Commission on Excellence in Special Education, 2002), suggested a growing number of students identified as LD may not have received adequate instruction in general education and could possibly account for the disproportionate number of students receiving support in this category. Thus, fundamental questions about how to best identify, categorize, and provide instruction for students with LD began to take center-stage in the minds of many researchers and policy makers (Lyon & Weiser, 2013).

LD: An Historical Context

European foundation 1800-1920. Research on LD can be traced back to the late 1800s when Kussamaul, a German neurologist, first coined the term "word blindness" to

describe a phenomenon of "text blindness" when the intellect and ability to speak were intact (Courtad & Bakken, 2011). During this time period, often referred to as the European Foundation, doctors and researchers across Europe were primarily focused on observing the relationship between brain injury and behavior. These studies led to seminal achievements in the field of LD including the first use of the term "dyslexia" to describe difficulty with interpretation of printed symbols and James Hinshelwood's report which suggested a need for early identification of children who demonstrate difficulties with text (Hallahan et al., 2013).

US foundation: 1920-1965. By 1918, compulsory education laws had been passed in all US states; and educators across the US began to focus on widespread literacy for the first time. During this time, the push to further investigate difficulty with interpretation of written letters had become prevalent in the US as interest grew in understanding why some children found learning to read difficult. One result of compulsory education was that researchers during this period moved from conducting observations outside of schools to working with students in educational settings. This shift changed the focus from etiology of reading difficulties to the development of remediation, interventions, and diagnostic assessment tools (Hallahan et al., 2013). It was also during this period that Samuel Orton, a neuropathologist, first began to hypothesize that Intelligence Quotient (IQ) was not always reflective of intellectual capacity, especially as it related to reading difficulties. While controversial at the time, Orton's hypothesis affected educational practices that impacted the field of LD for years to come.

Emerging period: 1965-1975. By the mid-1960s, the research conducted during the Foundation Period had resulted in the development of instruments for identifying students with disabilities and tools to assist in instruction. And although the construct of LD had not been identified yet, parent and teacher groups began to found organizations to advocate for students with disabilities. Then in 1962, Samuel Kirk used the term "learning disability" in a textbook on the education of exceptional children (Kirk, 1962). In 1963, Kirk again used the term (meant to define a delay in the development of the process of speech, reading, writing, language, math, or other academic subjects), in a speech delivered to a parent advocacy group. This advocacy group later became the Learning Disabilities Association. In 1965, Barbara Bateman, a student of Kirk's put forth a definition of LD that included the concept of an achievement-aptitude discrepancy for the first time (Bateman, 1965). Bateman suggested learning disorders were caused by the existence of a significant discrepancy between a learner's estimated potential and their actual level of performance (Hallahan, et al., 2013). From that point forward, the construct of LD was tied to the notion of a discrepancy.

Shortly thereafter the federal government began to show interest in the field of LD. Federal projects (Minimal Brain Dysfunction: A National Project on LD in Children) and committees (The Advisory Committee on Handicapped Children) were funded and charged with defining LD in a way that could be used in legislative making processes and to secure funding for LD research (Lyon & Weiser, 2013).

Solidification period: 1975-1985. Thirteen years after Kirk's presentation, LD was federally recognized as a category of exceptionality when the EAHCA (PL 94-142) was signed into law in 1975. Just after this enactment, the federal government also funded five institutes to investigate applied research in LD (Hallahan, et al., 2013). The research conducted within the institutes was meant to address academic skills, memory, social competence, educational interventions, attention, and decision-making processes in students with LD. As a collective group, the work done within the institutes proved to be highly influential on the field.

Instructional Focuses in LD

In the first two decades after the passage of PL 94-142, the field of LD grew into what was the most prevalent category of students within special education. Thus began a time of evolution in the instructional approaches used to address their needs (Bursuck & Epstein, 1987). In the 1960s, many educators focused on remediating the cause of LD (Lessen & Dudzinski, 1989) before academic interventions could take place. This heuristic approach grew primarily out of the foundational work done by Straus and Werner which suggested that remediating the underlying cause of LD was paramount to providing academic support (Lessen & Dudzinski, 1989). One reason the focus remained on remediation (rather than intervention) during this time may have stemmed from the use of the term "minimal brain dysfunction" as a way to classify students who demonstrated difficulties learning (Hallahan & Kauffman, 1997). The term caused difficulty for two reasons: (1) it implied the problem resided within a learner's central

nervous system and, (2) it did not result in educational guidance or instructional decision making (Courtad & Bakken, 2011). Without a clear path towards instructional interventions, researchers and educators instead focused on addressing the cause of LD.

By the 1970s, applied behavior analysis techniques began to take the place of remediation attempts as researchers and educators shifted their focus to observable behaviors, antecedents, and consequences (Bursuck & Epstein, 1987; Lessen & Dudzinski, 1989). This occurred mainly as the remedial techniques from the 1960s were found to be relatively ineffective in addressing academic problems for students with LD (Hallahan & Mercer, 2001). The primary focus of instruction during this period was geared towards specific academic and life skills (Lessen & Dudzinski, 1989). The period between 1975 and 1985 is generally thought of as a period of calm for the field of LD (Hallahan & Mercer, 2001).

In subsequent decades (1980s and 1990s), the integration of cognitive strategies and observable behaviors with instruction and intervention geared towards information processing became prevalent. Instruction during this period was intended to provide students with both processing skills and the meta-cognitive skills needed for academic success. Teachers often relied heavily on self-regulation and self-management during this time (Poplin, 1998).

Not only did instructional practices shift in the early decades of public education for students with LD, service delivery settings and mechanisms for identification did as well (Vostal, Hughes, Ruhl, Benedek-Wood, & Dexter, 2008). The period between 1985

and 2000 was marked by turbulence in the field. During the last decade of the 20th century debates regarding the definition of LD raged on. These definitions were focused on stressing the chronic, lifelong nature of LD (LD Association of America, 1988) the potential impact of social deficits, and the possibility of co-morbid disorders (NCJLD, 1988). There were also many critiques of identification practices during this time. Critics of the aptitude-achievement discrepancy model began to argue that formula did not correctly identify students with LD and that students with and without discrepancies may not differ in their performance on academic skills (Fletcher et al., 2001).

Additionally, debates about mainstreaming and placement were sparked when Madeleine Will, Assistant Secretary of Special Education, launched the Regular Education Initiative (REI), which prompted general education staff to take a greater responsibility in the education of students with special needs (REI; Hallahan, et al., 2013). Between 1975 and 2001, the number of students served under the category of LD grew by more than 260% (US Department of Education, 2010). During this time, students with high-incidence disabilities (i.e., LD) that commonly received an education in resource and self-contained classrooms during the 1970s and 1980s began to be included in general education classrooms with greater frequency (Vostal et al., 2008). This massive expansion of the category of LD, the debates over identification and definitions, and the push for more inclusive educational settings set the stage for fundamental changes in the upcoming decades.

LD in the 21st Century

For students with LD, the start of the 21st century was a critical time (McFarland, Williams, & Miciak, 2013). As the field grew, researchers developed a greater understanding of the developmental causes and instructional needs of children with LD, and the number of scientific investigations into these causes grew at astounding rates (Lyon & Wieser, 2013). This era was marked by the increased importance placed on performance demands (introduced in NCLB early in the decade) followed by changes in methods for identification of LD (introduced in IDEA in 2004). While these policies seemed to impact the growing nature of the field, 38% of those students who qualify to receive special education services still do so under the category of LD (US Department of Education, 2010). And although there have been extremely aggressive attempts to apply the scientific method in order to further explore LD, fundamental questions about how to best provide support for identified students still exist. Researchers and professionals continue to focus a significant amount of time, money, and resources hoping to find answers (Gersten et al., 2005; McFarland, et al., 2013).

Scholarly Literature on LD

One result of the focus on LD has been the publication of many scholarly articles and the development of entire journals focused on improving knowledge about this condition (Heath, Toste, & Roberts, 2007). The *Journal of Learning Disabilities* (JLD) was the first published scholarly journal focused primarily on LD. JLD began publishing in 1967, followed by *Learning Disability Quarterly* (LDQ) in 1978 and *Learning Disabilities Research and Practice* (LDRP) in 1991. Because of the influence scholarly

journals have on the research community and the subsequent impact research has on practice (Gersten, 2005), there is a need to systematically investigate the content of published articles within them (Lessen & Dudzinski, 1989; Mastropieri et al., 2009). By understanding what is important to the field of LD and what issues have been addressed in the published research, it becomes possible to identify trends and gaps, potentially bridge the chasm between researchers and practitioners, and shape future research agendas (Mastropieri et al., 2009).

One way to conduct investigations that explore published literature is through content analysis (e.g., Lull Pool, Macy, McManus, & Noh, 2008). Content analyses can help identify emerging trends and patterns in the literature and provide insights into the historical development of a field. Within the field of LD, content analyses emerged in the late 1980s (Bursuck & Epstein, 1987; Lessen, et al, 1989) and have been represented in the literature within the last few years (e.g., McFarland, et al., 2013; Mastropieri et al., 2009). Many of these analyses explore publications dating back to the 1960s and chronicle one specific area within the field (e.g., intervention research; Mastropieri et al., 2009) or identification criteria, McFarland, et al, 2013), one journal in the field (e.g., *LDRP*; Vostal et al., 2008), or a restricted date range (e.g., one decade or one issue year of a journal; Bursuck & Epstein, 1987; McFarland, et al., 2013). In addition to these content analyses, attempts to identify and develop consensus around classic or seminal articles in special education have also been conducted (McLeskey, 2004; McLeskey & Landers, 2006; Patton, Palloway, & Epstein, 1989).

While these previous investigations (Bursuck & Epstein, 1987; Heath, et al., 2007; Lesson, et al., 1989; Mastropieri et al., 2009; McFarland, et al., 2013; Vostal et al., 2008) use systematic analysis to chronicle changes in how research on LD has evolved over time, by including every article in a given time period or journal, the relative influence of the findings are not assessed. One way the scientific community assesses the quality and impact of the scholarly literature is by using citation counts (Smart, 1983). Citation counts, or citation frequency measures, are based on counting of reference citations attached to publications. And although "quality" is a difficult and subjective construct to measure, evidence indicates a consistent pattern of moderate to high correlations (0.20-0.56) between citation frequency measure and perceptions of quality, stature, and article ranking by those in the scientific community (Bornmann & Daniel, 2008; Lowell, 1999; Smart, 1983; Smart & Elton, 1981). In addition, by isolating literature based on citation rate, it may be possible to collect a corpus of studies objectively recognized as important and influential (Swanson, Plank, & Still, 1988) to the development of the field. Analysis of articles based on citation rate frequency could further identify historical patterns and emerging trends in the literature deemed most impactful by members of the scientific community who access it regularly (McLeskey & Lesson, 2006; Swanson, et al., 1988). To date, a content analysis of highly cited literature in LD has not been conducted.

Proposed Content Analysis and Rationale

The purpose of this investigation is to analyze the content of frequently cited articles (100 +) published since the enactment of PL 94-142 with an emphasis on publications addressing issues related to LD. By focusing specifically on articles with high citation rates (100 +), this analysis not only seeks to identify the trends and evolution of research in LD but does so by using the work that has been marked as the most important and potentially influential by professionals in the field. This content analysis of highly cited literature also seeks to highlight influential topics in LD and to provide a mechanism to better understand the historical development and context of the field by identifying gaps in the research and targeting potential future research topics (Mastropieri et al., 2009).

The proposed content analysis uses highly cited articles (100 +) and recently published, potentially promising articles (ie., published between 2004 and 2014 with 25 to 90 citations) published in three scholarly journals in the field of LD (*JLD, LDQ, and LDRP*) and one broad, cross-categorical journal *(EC)* recognized for its impact and visibility. The citation count of 100 was chosen based on previous content analyses in the field of special education that used citation rates (McLeskey, 2004; McLeskey & Landers, 2006; Swanson et al., 1988) as the criterion of inclusion. In previous analyses, citation rates ranged between 5 and 90 depending on the decade in which the articles were published. Based on previously studied rates and because the frequency in which scholarly papers are cited has been purported to directly relate to their quality and stature (Smart & Elton, 1981), a citation rate of 100 + was chosen as a way to potentially

identify highly influential papers in the field. Additionally, as a way to capture recently published articles (2004-2014), the criterion for inclusion was based on a graduated rate of between 25 and 90 citations depending on the year of publication (90 citations for 2004, 80 citations for 2005, stabilizing at 25 citations for 2011-2013). The articles included with the graduated citation rate will be deemed "potentially promising" for the purposes of this investigation.

This review spans 38 years, starting in 1975 with the enactment of PL 94-142 and ending with publications current as of September 2013. The dates that frame this investigation reflect a period of change that informed and developed how we address the education of students with LD in today's schools. The methods and results from previous content analyses (Heath, et al., 2007; Mastropieri, 2009; McFarland, et al., 2013) greatly informed both the process of this work and the development of research questions.

Research Question

Based on the results of previous content analyses, the following research question was identified: What are the identifiable trends or patterns (i.e., authorship, content, methodology, populations, etc.) in the highly cited (100 +) and potentially promising (25-90 + citations) literature addressing LD between 1975 and 2013?

CHAPTER 2

Recent Related Analyses

Over the last four decades, various content analyses of the literature in special education have been conducted. These analysis can be generally categorized in one of three ways: (a) analyses that focus on one particular disability type such as cognitive disabilities (Heller et al., 1991; Swanson et al., 1988) or behavior disorders (Clarke, Dunlap, & Sticher, 2002; Gage, Lewis, & Adamson, 2010), (b) analyses that focus on LD journals with the intent to identify patterns in a specific area like intervention research (Heath et al., 2007; Mastropieri et al., 2009; Vostal et al., 2008) or identification and classification (McFarland et al., 2013) and, (c) analyses that seek to identify seminal or classic works in the field of special education (McLeskey, 2004; McLeskey & Landers, 2006; Patton et al., 1989). Although no previous content analyses used citation rate as a criterion for inclusion, it remains critical to understand their findings as they provide a historical context and framework for the current proposed investigation.

Types of studies. McFarland et al., (2013) indexed every article published in *JLD, LDQ, and LDRP* between 2001 and 2010 and conducted a content analysis aimed specifically at identification, description, and remediation of LD. Authors employed a series of coding choices in order to categorize articles including identification of empirical studies and intervention research, topical interest (i.e., LD identification, literacy, math, non-academic characteristics, psychometrics, services, LD theory and other), and participant characteristics. Findings indicated that within the corpus of

studies (841 articles), 67 % were empirical studies and the majority of those (57%) focused on academic topics. McFarland et al. (2013) coded empirical studies as those where novel data was collected and analyzed. Literature reviews, synthesis, and meta-analyses were coded as not meeting criteria to be considered as empirical. While understanding the trends in amount and type of empirical and non-empirical studies is an important finding, McFarland et al., (2013) limited their criteria for inclusion and excluded all synthesis and meta-analyses. It is possible that potential novel data may have been discovered had these types of analyses been included. Additionally, the authors did not disaggregate their findings in terms of research designs (e.g., experimental, quasi-experimental, single subject) and therefore they could not speak directly to the evolution of study design within the articles they explored. .

In addition to these findings, McFarland et al. (2013) revealed patterns occurring over time. During the first years of the decade between 2001 and 2010, the number of empirical studies grew (15%). This was followed by fluctuating pattern of increases and decreases that lasted until 2007. From 2007 to 2010 the number of empirical studies steadily increased. When considering the findings from McFarland et al. (2013), it is important to remember that all articles published within three journals on LD *(JLD, LDQ, and LDRP)* were included in their analysis. While this undertaking was considerable, it does not answer questions about the patterns of highly cited (and potentially influential) articles within the field.

Mastropieri et al. (2009) also approached their analysis by examining all articles published in 11 journals between 1988 and 2006 (see Appendix A). The authors categorized each of the articles (N = 6,724) as research-based, review, editorial, position, practice paper, or program reviews. Within those designations, the articles were further coded to identify whether intervention research in kindergarten through 12th grade settings included parents and teachers, descriptive studies, qualitative and case studies, or survey research was conducted. Findings indicated 58 percent of the articles (N = 3,899) were research based. Within the empirical articles, Mastropieri et al, (2009) found the greatest proportion of the studies were descriptive (24.1%) followed by intervention research in kindergarten through 12th grade (15.9%). Within the intervention research, the majority of studies used experimental methods (50.5%) or quasi-experimental methods (38.1%). While these findings disaggregate the data in a slightly more refined way than the McFarland et al., (2013) analyses, the Mastropieri et al. (2009) investigation did not seek to categorize the patterns or trends of research design. Instead, throughout their analysis, Mastropieri et al. looked only at broad classifications including research articles and non-research articles and noted similar findings to McFarland et al., (2013) in their analysis over time. While disaggregation of article type fluctuated slightly during the 19-year period, the number of research-based articles increased while the number of non-data-based articles slightly declined. It is also the case that analyses by McFarland et al., (2013) and Mastropieri et al. (2009) did not attempt to identify articles of influence based

on citation rates but rather included all articles published in their chosen journals and time frame.

Primary topics. Reading was the most frequent topic explored across many of the analyses. In their analysis, McFarland et al. (2013) also reported the most frequent topic interest as literacy (31.9%) followed by non-academic (sociobehavioral) characteristics (23.3%), and identification processes (11.9%). Mathematics, service delivery, LD theory, and other topics each represented 10% or less of the total area of interest.

Heath et al. (2007) reviewed all articles published in three LD focused journals *(JLD, LDQ, and LDRP)* over a decade. The results of the content analysis (N = 1,077) identified five core topics were prevalent within the journals including: reading processes and instruction (20.07%), mathematics processes and instruction (8.49%), identification and diagnosis (6.96%), ADHD (4.61%), and cognition (4.45%). Using change scores reflecting the first and second halves of the decade, they identified the greatest area of growth within the research as English language learners (3.08%), reflections on LD (3.06%), RTI (2.76%), assessment (2.48%), and mathematics (2.36%).

In a review of *LDRP*, Vostal et al. (2008) identified the top three frequently addressed topics published from 1991 to 2007 as: reading (18%), assessment and identification (16%), and inclusion (11%) with the bulk of the academic interventions also focused on literacy (35%). The authors noted a steep upward trend in the amount of

reading articles published between 1998 and 2001, which could be partially explained by the release of the National Reading Panel report in 2000 (Vostal et al., 2008).

Including students with LD. McFarland et al. (2013) found that of the articles they indexed, 56.5% included participants with LD. Low achievers (or students at risk) were the second most studied population with about 11% of the total. Mastropieri et al. (2009) found that within the intervention research articles, approximately 31% sampled populations made up entirely of students with LD. It is important here to note that Mastropieri et al. indexed and categorized 6,724 articles over a 19-year period, and McFarland et al. (2013) analyzed 841 articles over a decade. While there was some overlap in the journals analyzed and the time period explored, it was not intended for this data to be compared using an apples-to-apples approach. However, it is possible to identify and compare patterns within the investigations.

According to McFarland et al., (2013) the number of studies with participants identified as LD decreased approximately 20% after 2005 and stayed stable. Articles focused on the identification of LD constituted 12% of the total but also saw a spike in 2005 (29%). The majority of these articles were non-empirical. That is, articles provided methodological and theoretical perspectives of LD. See Appendix A for a review of previous content analyses of literature on LD.

Early Analyses

In the period between 1970 and 1990, two content analyses of the LD literature were conducted. Lessen et al. (1989) analyzed trends in intervention research for students

with LD in seven major education journals (see Appendix A) published between 1978 and 1987. Lessen et al. (1989) included only empirical articles that studied school-age students in their analysis. Results revealed that almost one third of the studies included five or fewer subjects and an additional 16% employed between six and 10 subjects. Similar to the work conducted in the early 2000s, more than half (54%) of the studies reviewed had subjects identified as LD. However, one major difference is that during this time no consensus existed about the methods for identifying LD and thus the samples may not have reflected the same kind of students as included in previous research. Authors suggested that additional research be conducted on group design using students with LD, especially to begin generalizing findings of the single-subject or single group studies (Lessen et al., 1989).

Approximately two thirds of the studies indexed by Lessen et al. (1989) indicated that research attempted to conduct academic interventions. However, approximately one third (36%) of those studies did not specify a reason or need for implementing the intervention. Additionally, less than 4% of articles published during that time were academic interventions specifically focused on students with LD. Similar to the results found in the early 2000s, results from the 1980s indicated literacy as the most commonly studied academic area constituting just shy of two thirds of the total (62%).

Bursuck and Epstein (1987) reviewed the 1984 issues of both *JLD* and *LDQ*. They included only empirical studies, position papers, and literature reviews in their analysis and found that assessment and remediation of academic problems was the most

frequently addressed topic (25%) within the journals. Of the empirical articles, they categorized roughly half as interventions.

Seminal and Classic Works

Examinations of the history and development of the field of special education have also been published in books and scholarly journals dating back to the 1970s (McLeskey, 2004). One purpose of these historical analyses is to identify seminal works, or classic articles, that have had a significant impact on the field. While identification of seminal and classic works is not the focus of this investigation, a greater understanding of the historical context of the field of LD is needed. While categorizing and analyzing highly cited literature over the last four decades it is important to remain informed regarding foundational works and to make comparisons between any identified seminal articles and those with the most comprehensive citation rates (McLeskey & Lessen, 2006). These comparisons may assist in further refining the list of most influential (or seminal) works and can provide a perspective on the topics and kinds of research professionals deem most essential. This kind of analysis can also provide a more developed sense of the field's evolution.

Using citation rates as a measure, McLeskey (2004) looked at articles published between 1960 and 1996 and sought to identify the most frequently cited articles in special education journals. Using the Social Science Citation Index authors identified all articles with varying citation rates (40-60) depending on the year of their publication. For example, due to their recent publication date articles from the 1990s were accepted with

40 or more citations whereas articles from the 1960s and 1970s needed to have 60 or more to be included. Based on these criteria, McLeskey (2004) identified 50 articles spread relatively evenly across the decades in which they were published. Of those top 50, the author identified a list of "Ten Classic Articles," although it is important to note the list was made subjectively and was based on the author's idea of which works had made a significant impact in the field.

Using the same 50 articles identified in McLeskey (2004), McLeskey and Landers (2006) used survey research to further identify classic articles. The authors selected a panel of experts (consisting of faculty at doctoral degree granting institutions) to help rate classics from the given list of articles. Faculty were surveyed using an online questionnaire and were given 30 days to give their opinion. From the 63 responses received, there was some agreement on the ratings of the 50 articles. Six articles (Deno, 1985; Dunn, 1968; Kirk & Bateman, 1962; Reynolds, Wang, & Walberg, 1987; Stainback & Stainback, 1984; Will, 1986) received at least a 50% or more of the faculty's votes identifying articles as classics. Of those, Dunn (1968) received the highest rating at 73%. Of the six articles receiving more than 50% of the vote in the McLeskey and Landers (2006) survey, four were also in the "Top Ten" list created in McLeskey (2004).

Patton et al., (1989) used survey research methodologies to determine whether they could identify seminal works within the field of special education. Their findings revealed no consensus in regards to the most influential research. It is interesting to consider that in 1989 the field of special education was relatively young, and the

McLeskey (2004) and McLeskey and Landers (2006) studies had not yet been conducted. Since that time, legislation, policy, instructional practice, and research agendas have shifted considerably. While consensus regarding seminal works was not reached 27 years ago, the case may not be the same if the same work was replicated today. This is evident based on the overlap in ratings from the 50 most cited articles and the previously described "Top Ten" list. Appendix B provides comparisons of the seminal works identified by McLeskey (2004), McLeskey and Landers (2006), and Patton et al. (1989).

CHAPTER 3

Project Conceptualization

Work on this project started by consulting two university librarians who assisted in determining the best methods for identifying the literature with the designated citation rates. With their guidance, the most appropriate search engines were identified as Web of Science (WOS) and Google Scholar (GS). WOS is recognized as a respectable source for indexing scholarly journals and GS has significant search capabilities, which include sources not often indexed by WOS. It is important to note some differences between the search engines: WOS only tallies citation rates from other journals housed within its system (i.e., if an article is cited by a journal or source not included in WOS, that citation is not added to the total count); therefore, the articles within WOS have considerably more conservative citation rates relatively speaking. Comparatively, GS is highly inclusive in its search capabilities (i.e., GS searches multiple journals, databases, and other engines simultaneously). However, because of its inclusive nature, GS results may include a variety of items that do not meet criteria. All GS searches subsequently required an extensive crosscheck to ensure for precision in the inclusion criteria. Because GS provides citation rates from any and all sources not exclusive to other academic journals (i.e., citations from presentations, policy work, and reports) the counts were significantly higher than those in WOS. For the purpose of this study, GS citation counts were used during coding. This was done due to the limited number of journals indexed in WOS and as a mechanism to unsure the search was as inclusive as possible.

Journal selection and search procedures. Based on the guidance from two professional librarians, three peer-refereed journals that publish primarily on LD and one cross-categorical journal in special education were selected. They include: (a) *EC*, (b) *JLD,* (c) *LDQ*, (d) *LDRP*. While this sample is not exhaustive, it does include those journals that publish specifically on LD topics and represents primary sources for original, scholarly publications. Issues published between 1975 and 2013 were included in the search as they contain all articles published starting in the year PL 94-142 was enacted.

Database construction. Journal issues were examined primarily using electronic access, although many publications dated prior to 1990 were not indexed electronically and had to be searched either by hand or requested via InterLibrary Loan. An initial search using the Web of Science (WOS) was conducted followed by a secondary search in GS. (It should be noted that only EC, JLD, and LDQ are indexed within the WOS database.) The search was conducted by journal and individual year; Search terms included date range and journal name. When articles meeting criteria (100 + citations, published between 1975 and 2013 in the selected journals) were identified, they were imported from the search engine into a database using a feature that allows for reference libraries to be created directly in EndNote (software allowing for the categorization of large reference libraries). Both WOS and GS include this feature (see Appendix D: Screen Shot of Search). During the secondary search of GS, the same procedure was followed with one exception; the search was defined by parameters in the settings feature

to include only those articles tagged as concurrently held within GS and PsycNET and/or Education Resources Information Center (ERIC). This was done as a mechanism to help control for type of hits resulting in GS. By defining parameters around PsycNET and ERIC resources such as conference presentations and legislative reports were generally excluded. At the time of the search, copies of all results were downloaded into PDF form. These were used to cross check the search results during the database organization. The GS and WOS searches yielded 563 articles.

Database organization. Organization started with additional consultation from two university librarians, one of whom specializes in EndNote (EN). Search results indexed in the database were crosschecked against the downloaded results to ensure all articles meeting criteria were included and any inappropriately identified (e.g., those note meeting citation count rates, legislative reports, books, etc.) articles were excluded. Duplicates were also identified and deleted. EN is highly customizable and allows the user to create personalized fields in order to better organize their database. Generally speaking, EN organizes references by listing the author, date of publication, title, journal of publication, and key words. However, for the purposes of this content analysis, additional fields were needed in order to better categorize the literature. Because of this, custom fields were developed to include categories for citation counts, abstract, and search engine origin. In addition, EN allows the user to organize articles into groups or subsections. This is conducted in a similar way an email inbox might be organized. Articles can be grouped by author, year, or in any customizable fashion the user prefers.

For this project, groups were created in order to subdivide articles by year and journal. This helped organize the cross checking process and provided a systematic method of ensuring the correct articles were included.

It should be noted that the citation rate for all included articles was documented in mid-September of 2013. Because citation rates generally increase with time, all articles were identified and indexed within a 48-hour period to ensure accuracy. It is important to note these citation counts reflect a snapshot in time and I acknowledge their changing nature.

Feasibility Study

After database construction for this proposed investigation was completed, a feasibility study content analysis was conducted using a subset of the indexed articles. The purpose of this feasibility study was to provide a broad, descriptive analysis from the highly cited literature (100 +) published between 1992 and 2013 in *EC, JLD, LDQ, and LDRP*. This time frame was chosen as a way to address literature published since the reauthorization of IDEA, and it was intended to provide a general idea of any emerging patterns or trends within the publication types, authorship, research methods, and topical content areas published within the last 20 years.

Research questions for the feasibility study were addressed in the following order: 1) What are the identifiable historical trends or patterns in the heavily cited (100+) literature addressing LD? Following the successful identification of trends and patterns, we selected a series of additional research questions to explore. These research questions

were intended to give a more in-depth look into the broad trends to disaggregate any further emerging patterns. They include: 2) What are the identifiable historical trends or patterns, if any, in the content (e.g., reading, mathematics) of the highly cited literature in the field of LD? 3) What are the identifiable historical trends or patterns within the types of articles and/or studies (e.g., experimental designs, correlational studies, qualitative designs, commentary, policy, etc.)? 4) During the last two decades, how and to what extent, have students with LD been included in the identified literature?

Work on the feasibility study began by developing coding categories and further organizing the database. Articles published between 1992 and 2013 were grouped into a separate library from aforementioned database. After organization, abstracts for each of the 302 articles were disseminated to three members of the feasibility study coding team. Together, these coding team members (two graduate students studying special education and one professor in the special education department) reviewed the content of the abstracts and individually developed a list of categories they thought would best represent the content of the articles in the database (e.g., reading, inclusion, Attention Deficit Hyperactivity Disorder [ADD/ADHD], behavior, etc.) After individual categories were developed, the team met and came to a consensus regarding which were most representative. In addition, the coding team members discussed other facets of the code sheet including pertinent article descriptors (i.e., title, year, author, etc.).

The following coding categories and decisions were included in the code sheet (Table 1): title and author, year of publication, journal of publication, origin of work,

citation count, primary and secondary content, research methodology, age and grade of participants, whether the authors disaggregated data for participants with disabilities, identified disability category of participants, and whether or not the study involved intervention research. While some coding categories required closed responses (i.e., yes or no), others asked the coder to choose from a selection in a dropdown menu (primary content: reading, mathematics, behavior, service delivery, etc.; article type: experimental, qualitative, commentary, etc.; participant characteristics: LD, at-risk, age, grade, etc.). The choices within the dropdown menus were developed based on the content of article abstracts. Prospective categories were developed individually by each team member and were finalized upon consensus. Table 1 provides detail concerning coding categories and Appendix D contains a sample code sheet.

Table 1

Coding Categories

Category	Coding Decisions
Study Origin	United States or International
Primary Content	(a) Reading, (b) Mathematics, (c) Writing, (d) LD Identification, (e) Research Methods, (f) ADD/ADHD, (g) SPED Service Delivery, (h) RTI, (i) CLD*, (j) Inclusion, (k) SPED Teacher Training and/or Attrition, (l) Phonological Awareness, (m) Behavior and Social Emotional, (n) Transition and adulthood, (o) Content area instruction and; (p) Other
Secondary Content	(a) Reading, (b) Math, (c) Writing, (d) LD Identification, (e) Research Methods, (f) ADD/ADHD, (g) SPED Service Delivery, (h) RTI, (i) CLD, (j) Inclusion, (k) SPED Teacher Training and/or Attrition, (l) Phonological Awareness, (m) Behavior and Social Emotional, (n) Transition and adulthood, (o) content area instruction and; (p) Other
Article/Design Type	(a) Experimental, (b) Quasi-experimental, (c) Single Case, (d) Commentary, (e) Qualitative, (f) Correlational, (g) Longitudinal, (f) Synthesis/Meta Analysis, (g) Systematic review of literature (h) Descriptive/Characteristics and; (g) Other
Grades/Age	(a) Pre-K, (b) Elementary, (c) K-12*, (d) Middle School, (e) High School, (f) Secondary, (g) College/Post Secondary, (h) Other, (i) Not Reported, and; (j) Not Applicable
Is data for participants with disabilities disaggregated?	Yes, No, All participants have disabilities
Disability Category*	(a) Learning Disability, (b) Autism/Asperberger's, (c) EBD, (d) Vision Impairment, (e) Hearing Impairment, (f) OHI, (g) Cognitive Impairment, (h) TBI, (i) Speech-Language Impairment, and; (j) Other
Was the research an intervention study?	Yes or No

Note. CLD = Cultural and Linguistic Diversity; K-12 = any combination of or single grades could be chosen; Age = Age of participants was input as indicated by authors; Disability Category = Any combination or single disability could be chosen if the data was disaggregated

Table adapted from: McFarland, Williams, and Miciak (2013). Ten years of research: A systematic review of three referred LD Journals. *Learning Disabilities Research & Practice 28*(2), 60-69.

An initial round of coding was conducted after the categories were agreed upon. Each of the three members coded, double coded and discussed outcomes. In order to enhance alignment between the code sheets and the literature, slight changes were made to the categorical dropdown menus at this time. Inter rater reliability reached 90% across

all three coders and remaining coding for the preliminary analysis took place. Each team member coded and subsequently double coded a subsection of the remaining articles (316) sampled from all four journals during a 20-year time span (1992-2013). Approximately 30% of the articles were double coded (95% reliable). After coding was complete, data was extracted and imported into a spreadsheet where the results were organized and disaggregated by author, content, citation count, methodology, etc. At this time, an additional cross check was conducted to ensure all articles in the database were coded and categorized appropriately. Figure 1, Project Development Flow Chart, provides an illustrative description of the search, database construction, and coding process.

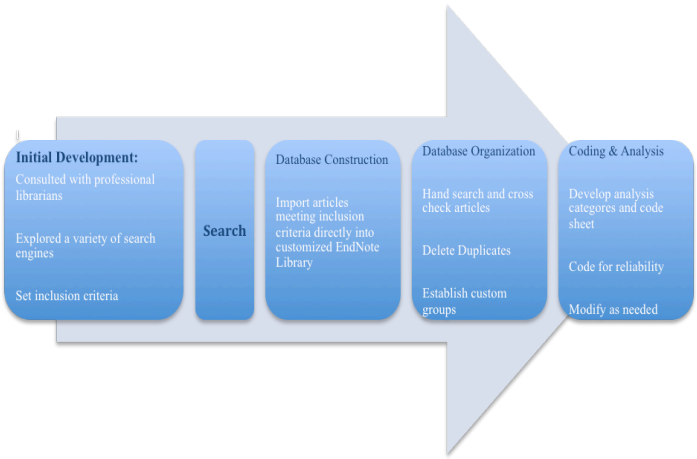


Figure 1. Project development flow chart. Illustrated steps in this project from development to coding.

Results of the feasibility study indicate the presence of emerging patterns in article type, content area focus, and the inclusion of students with LD in the published research. General trends identified (Table 2) in the corpus of studies ($N = 316$) are included in tables 4, 5, 6, and 7. The top five content areas represented were reading

(15.8%), behavior/social emotional (9.5%), LD identification (8.2 %), mathematics (8.2%), and special education (SPED) service delivery (7.0%).

Table 2..

Trends in primary content 1992-2013

Primary Content	Number	Total % (n = 316)
Other	59	18.7
Reading	50	15.8
Behavior/Social Emotional	30	9.5
LD Identification	26	8.2
Math	26	8.2
SPED Service Delivery	22	7.0
Inclusion	20	6.3
CLD	18	5.7
RTI	13	4.1
Phonological Awareness	13	4.1
Writing	11	3.5
SPED Teacher Training	10	3.2
ADD/ADHD	9	2.8
Research Methods	8	2.5

Note. ADD/ADHD = Attention Deficit Hyperactivity Disorder; CLD = cultural and linguistic diversity; RTI = response to intervention; SPED = special education

In addition, publications categorized as "other" made up 18% of the total (Table 3). Because this was the largest subsection, the articles within the "other" category were further analyzed for patterns. This analysis indicated adulthood and higher education were the largest area of focus (11.9%), followed by articles addressing motivation (10.2%), gifted education (5.1%), and curriculum-based measurement (5.1%).

Table 3.

Disaggregation of "other" category

Other	Number	Total % (N = 59)
Adulthood/ Higher Ed	7	11.9
Motivation	6	10.2
Gifted	3	5.1
CBM	3	5.1

Note. CBM = curriculum based measurement

In order to examine the trends in topic area over time, data were disaggregated by decade. From 1992 to 2002, the highest percentages of articles categorized were labeled as "other" (see disaggregation of "other" category as mentioned above), followed by reading, mathematics, and behavior/social emotional. During that time period, there were no highly cited articles categorized as RTI, and only two focused on research methods. Between 2003 and 2013, the category of "other" was significantly reduced (six articles compared to 53 in the previous decade). Reading continued to be the most prevalent area of focus; however, there were no highly cited articles in the area of phonological awareness in this decade compared to 12 from the previous decade. Other differences between the two time periods include an increased focus on RTI (12 articles) and research methods (five articles).

Trends in authorship were also reviewed. Of the 225 primary authors included in the database, five were responsible for just over 11% of the total articles, ranging between five and nine published articles. Many of these authors were listed as secondary on additional publications; however, only primary authorship was reviewed (Table 4).

Table 4.

Primary Authors with 5 or more publications

Author	Number of pubs	Percentage of total
Fuchs, L.	9	2.8
Gersten, R.	8	2.5
Fuchs, D.	7	2.2
Vaughn, S.	7	2.2
Klinger, J.	5	1.5
Total	36	11.4

In addition, the most highly cited articles were indexed and can be found in Table 5. The most highly cited article (Horner et al., 2005) had 853 citations, followed by an additional eight articles with over 500 citations. Three of the authors included in the top five list of most prolific also have articles included with the highest citation rates (L. Fuchs, Vaughn, and Torgesen).

Table 5.

Top 10 highly cited articles 1992-2013

Author	Year	Count	Journal	Title	Primary Content	Article Type
Horner, R.H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M.	2005	853	EC	The use of single-subject research to identify evidence-based practice in special education	Research Methods	Commentary
Torgesen, Alexander, Wagner, Rashotte, Voeller, & Conways	2001	782	JLD	Intensive remedial instruction for children with severe reading disabilities: Immediate and long term outcomes from two instructional approaches	Reading	Longitudinal
Scruggs & Mastropieri	1996	775	EC	Teacher perceptions of mainstreaming/inclusion 1958-1995: A research synthesis	Inclusion	Synthesis
Torgesen, Wagner, & Rochette	1994	769	JLD	Longitudinal studies of phonological processing and reading	PA	Longitudinal
D. Fuchs D.& L.S. Fuchs	1994	673	EC	Inclusive schools movement and the radicalization of special education reform	Inclusion	Commentary
Fuchs D., Mock, Morgan, & Young	2003	642	LDRP	Responsiveness to intervention: Definitions, evidence, and implications for the learning disabilities construct	RTI	Commentary
Geary	2004	544	JLD	Mathematics and learning disabilities	Math	Commentary
Vaughn & Fuchs L.	2003	534	LDRP	Redefining learning disabilities as inadequate response to instruction: The promise and potential problems	LD Identification	Commentary
Torgesen	2000	510	LDRP	Individual differences in response to early interventions in reading: The lingering problem of treatment resisters	RTI	Commentary
Wolf, Bowers, & Biddle	2000	474	JLD	Naming-speed processes, timing, and reading: A conceptual review	Reading	Review

Note. *EC* = Exceptional Children, *JLD* = Journal of Learning Disabilities, *LDRP* = Learning Disabilities Research & Practice.

Patterns within content area. Publication data were further disaggregated within the top five highly cited content areas to identify both trends over time and specific content patterns. Across all publications, reading was the most prevalent topic. During the two-decade period between 1992 and 2013, an upward trend in the number of highly cited publications in reading was identified. The number of highly cited articles included in the

database began to rise in 1999 (five articles) peaking in 2000 with 10 publications in reading reaching citation rates of over 100. This number sharply declined in 2008. The nature of citation rates is that they accrue over time so it is highly unlikely that an article published after 2008 would have been in circulation long enough rate more than 100 citations by 2013. So, while there may be articles published after 2008 that will eventually have more than 100 citations, only one was identified: "The Blurring of Special Education in a new Continuum of General Education Placements and Services" (Fuchs, Fuchs, & Stecker, 2010). This lack of more currently published research (2008 to 2013) is addressed in the data analysis plan for the proposed investigation.

Within the subject area of reading, the specific primary focus and content of the articles were relatively evenly split. Figure 2 illustrates the content of articles addressing reading.

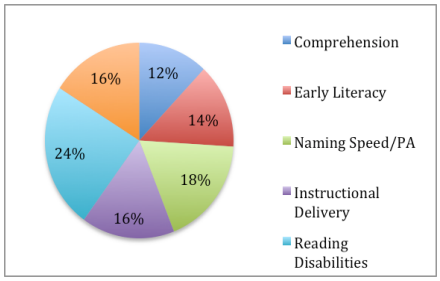


Figure 2. Types of reading articles. Illustrates content of articles coded as reading.

Reading disabilities (24%), naming speed/phonemic awareness (18%), and instructional delivery (e.g., strategy instruction, small group instruction; 16%) constituted the largest percentages of articles, however, early literacy (14%) and comprehension (12%) made up similar portions of the research. Within the reading category, publications

listed as “other” made up a large percentage (16%), which speaks to the varied nature of publications within the broad category of reading. It is important to note that articles were coded based mainly on their primary content. While a space to code for secondary content was available, it was used only when the article seemed to have a dual focus and a primary content could not be determined. Approximately one third of the articles coded as reading were coded as having a secondary focus of phonological awareness.

During the last two decades, there appeared to be a single year in which each content area indicated a significant spike in the amount of publications that have high citation rates. Figure 3 illustrates the number of publications by topic and by year.

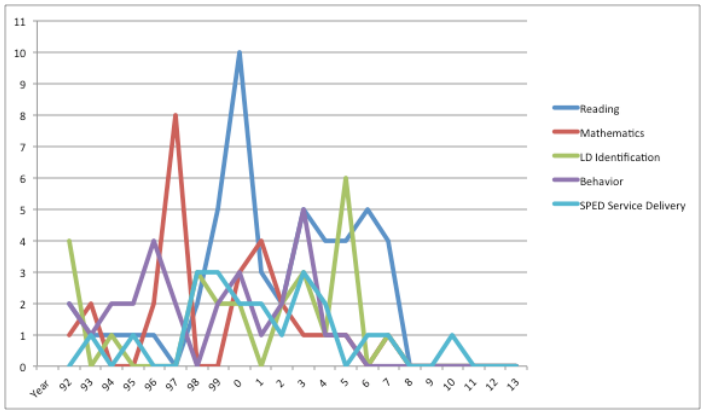


Figure 3. Number of publications by topic and year. Illustrates patterns in top 5 topic areas by year of publication.

Literature categorized as behavior/social emotional spiked in 2003. Forty-one percent of those articles were focused on the behavioral needs of students with LD. Within the literature on identification of LD, about half the articles (54%) were commentary articles focused on definition of LD and the other half (46%) addressed processes for identification (RTI) and characteristics of LD (mathematics LD, reading LD, etc.). The bulk of the highly cited articles on LD identification were published in

2005. Mathematics and special education service delivery were content areas where the amount of publications that are now highly cited were published starting in the late 1990s (1997 for mathematics, 1998 for service delivery). Of the articles in mathematics, half addressed mathematics disabilities (50%) and within service delivery, a third were focused on staffing, co-teaching, and the role of the paraprofessional.

Types of literature. Figures 4 presents the types of literature identified as highly cited over the two-decade period. Literature that provided a commentary or position made up the largest percentage (20%), followed by correlational work (13%) and syntheses/reviews (11%). Of the highly cited literature, 8% was categorized as experimental or quasi-experimental and seven percent was longitudinal.

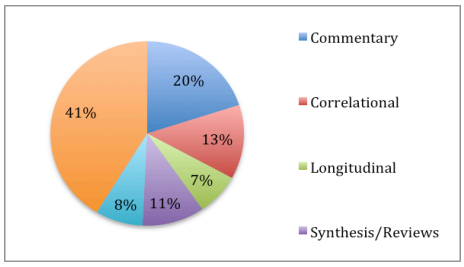


Figure 4. Articles by design type. Illustrates the portion of the top design types.

As we disaggregated the category of articles marked 'other,' clear patterns begin to emerge. Just less than half of the literature (41%) in this category was identified as reviews of literature. Many of the remaining articles in this section include varying statistical and mixed methods approaches (e.g., hierarchical modeling, structural equation modeling, factor analysis, surveys, and single case designs). These articles span across the content areas and were identified as 'other' because of their specific analysis methods.

Another interesting pattern that was identified with further disaggregation of the types of literature is how publication trends evolve over time. Within the category of articles marked as correlational, only six (17%) were conducted within the last decade. Many highly cited studies conducted between 1992 and 2003 focus on determining relationships between and among groups of students using assessment data to inform the research (e.g., providing a group of students with LD and a group of students without LD the same assessments and then describing the differences between them). Of the articles categorized as experimental and quasi-experimental, 60% were published after 2002. Fifty percent of the syntheses were published after 2002. This may speak to the way the field worked to first define, label, and understand populations of interest before researchers worked to systematically study, review, and consolidate best practices.

Including students with LD. Within the corpus of studies, 31% of the articles indicated some data (e.g., student assessment scores, academic outcomes, etc.) was disaggregated for students with LD. Of that total, 19% of the studies included only participants with LD while 11% disaggregated for LD specifically when participants had other disabilities or were non-disabled, labeled at-risk, or had academic difficulties.

Because the corpus of studies included many article types (e.g., commentaries) that did not disaggregate for students with LD, it was important to look closely to determine how these students were addressed within research studies (i.e., experimental, quasi-experimental, etc.). Of the studies categorized as experimental and quasi-experimental, just shy of half (48%) included students without disabilities and 22%

included only students with LD. Within the qualitative studies, eight of the total (18%) included students without disabilities and fourteen (31%) were conducted within populations where all students were identified as having disabilities.

Identification of seminal literature. There was minimal overlap between the feasibility study and previous attempts to identify seminal work (McLeskey, 2006; McLeskey & Landers, 2004; Patton et al., 1987; Swanson et al., 1988). This may indicate that a cohesive and agreed upon set of seminal or classic works has yet to emerge. It should be noted that while the feasibility study did not look at citation rates for articles published prior to 1992, the proposed investigation would do so for articles dating back to 1975. Further analysis is needed to determine if additional overlap exists between highly cited articles and identified seminal works.

Additional Research Questions

As a result of the feasibility study, secondary research questions for the proposed investigation were developed including: (1) Within the highly cited and potentially promising literature on LD, are there discernable trends or patterns within the most frequently identified content areas (e.g., reading, mathematics)? (2) What are the identifiable trends or patterns within the types of articles and/or studies (e.g., experimental designs, correlational studies, qualitative designs) and the types of methodologies used (e.g., experimental, quasi-experimental, single subject, case study, etc.)? (3) In the highly cited and potentially promising articles published since 1975, how

frequently is data for students with LD disaggregated from larger samples including students without LD?

Data Analysis Plan

The data analysis for the proposed investigation followed similar procedures to the aforementioned analysis in the feasibility study, with a few minor differences. The lack of recently published articles (after 2008) was addressed by altering the inclusion criteria from 100+ citations to a graduated rate declining by 10 citations a year. McLeskey (2004) used graduated citation rates as a way to identify potentially seminal works in special education and this proposed study used a similar mechanism. Articles were included based on a graduated rate: in 2004 with 90+ citations were included, articles with 80+ citations in 2005 were included and so forth until 2010. Starting in 2011 a citation rate of 25+ was used to ensure the most recently published articles were captured.

During the feasibility study, only a subset of the articles from 2002 to 2013 were coded and analyzed. Future analysis involved gathering the remaining articles, refining the code sheet, coding remaining articles, cross checking with search results, extraction of data, and graphing results.

Completion of the database. All full text articles remaining after completion of the feasibility were located, downloaded and imported into the EN database. If articles were not available electronically, an ILL was requested. If the journal was available in hard copy but not electronically, the article was scanned and entered into the database by

hand. After all articles were identified and entered into the database, an extensive crosscheck was conducted to ensure that every article from the search results was indexed in the database.

Coding. Once the database was complete, all remaining articles were coded. A code sheet similar to the one used in the feasibility study was utilized during this coding. Any changes made to the code sheet reflect the findings from the feasibility study. One major change was within the coding decisions for article design type. In the feasibility study, we learned that much of the research conducted in the early 1990s was what might be labeled as "characteristics" or "descriptive" research. One example of this is when a researcher assesses participants with LD and participants without LD and then describes the differences between the groups. When the coding categories were developed, characteristics/descriptive research was not listed in the possible choices. Instead, the label given to these articles was "correlational" which does not accurately describe the research. During the feasibility study coding, it became clear that researchers often employed these techniques, especially in the 1980s and 1990s. Because of this, the code sheet was refined to include "characteristics and descriptive" as one choice in article design. Additionally, the primary and secondary content area menu was modified to include transition/adulthood and content area instruction as options. This change reflected findings from disaggregation of the "other" category during the feasibility study analysis. All previously coded articles were double-checked and recoded using the new categories as appropriate.

Extraction and data analysis. After articles are coded and crosschecked, data from the code sheets was extracted into a spreadsheet for analysis. This spreadsheet housed the data extraction from the feasibility study and was refined to reflect code sheet changes and additional articles. After the extraction of data is complete, analyses was conducted to search for trends and patterns. The spreadsheet was built with the intention to be customizable by topic, design, author, year, citation count, or any other desirable subject matter. As a mechanism to answer the proposed research questions articles were sorted by all relevant criteria

CHAPTER 4

Trends in Topic

The top five most frequently addressed topic areas within the complete database were reading, special education (SPED) service delivery, behavior and social emotional, LD (learning disability) identification, and mathematics. Of those, articles that addressed reading constituted the largest portion (17.7%). This portion more than doubled the portions of articles in the remaining four frequently addressed categories. Articles which addressed SPED service delivery (8.5%) represented the next largest portion, followed by behavior and social emotional (7.8%), LD identification (6.9%), and mathematics (6.6%).

Although not in the top five most frequently addressed topics, literature on Cultural and Linguistic Diversity (CLD) topics made up 6.2% of the total, which was just shy of the number of mathematics papers. The next most prevalent category, Response to Intervention (RTI), represented a considerably smaller proportion than those in the top five, at 3.9%. When combined, articles represented in the top five topical categories comprised 47.8% of the total ($N = 677$). With CLD articles combined into the aggregate percentage of frequently addressed topic areas, the total represents 54% of all articles that met the criteria for inclusion.

Articles coded as "other" made up 16.5% of the total (112 articles), which was a significantly smaller portion than those found in the feasibility study (30.0%). This decreased percentage may be the result of the addition of coding categories for both article type (e.g., descriptive research) and topic (e.g., transition and adulthood, content

area instruction). These changes were based on the results from disaggregation of article topic and type within the "other" category and were made after feasibility study coding was completed. When the data coded as "other" was further disaggregated for this study, the largest subsections of articles with similar topical areas were self-determination skills for students with disabilities (2.6%) and assessment (2.2%). Because the proportion of articles represented in the self-determination and assessment categories stood out as frequently addressed topics, they were added to the topic choices on the code sheet. Besides self-determination and assessment, no additional article type, topic, or design constituted more than 1.0% of the corpus.

Topics over Time

As a mechanism to further understand when, and on what topic, various articles were published, data were disaggregated based on year of publication. The large nature of this database ($N = 677$) and the time span (1975-2013) of publications made it critical to break time periods into sections large enough to allow for interpretation of patterns in publication over time and small enough to demonstrate potential emerging trends. For that reason, five-year periods were selected as the unit of measurement. It is important to note that the number of articles meeting the criteria for inclusion from each time period fluctuated. While data were represented as proportions of each topic or methodology represented during that time period, the total number of articles fluctuated. This fluctuation made it difficult for analyses between time periods. For that reason the number of articles that constituted each section was also included in this analysis. Figure

5 illustrates the number of articles published during each 5 year period that address the top 5 content areas in the database.

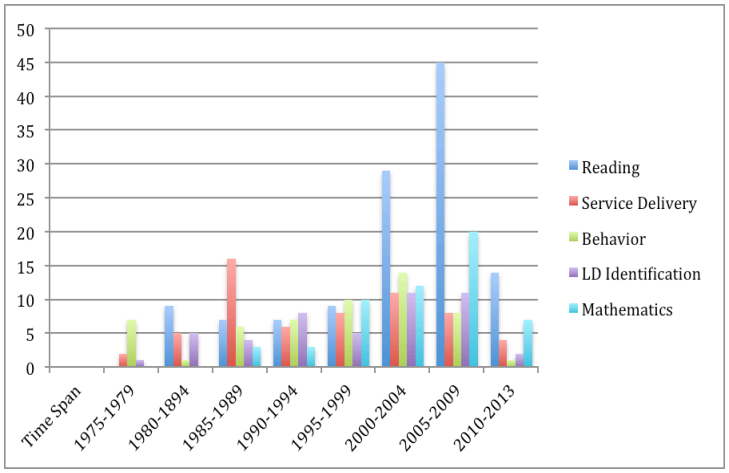


Figure 5. Top 5 topics across time. Illustrates the number of articles addressing the most frequent topic areas published during each disaggregated 5 year period.

Late 1970s and early 1980s. Highly cited articles published between 1975 and 1979 made up 2.3% (n = 16) of the corpus of studies. Those addressing behavioral and social emotional topics made up 43.5% of the total during this time. Of the behavior and social emotional articles, 71% addressed social status, social relationships, and peer perceptions of students with LD. Articles addressing SPED service delivery made up 12.5% of this time period and focused primarily on the structure of special education programs. Remaining articles were coded as "other." Within the "other" category, articles addressed diet and disability, music curriculum, and sensorimotor skills.

Highly cited articles published between 1980 and 1984 made up 5.3% (n = 36) of the corpus of the studies. When compared to the previous 5-year period, there was a decline in the number of articles that addressed behavioral and social emotional topics (n

= 1, 2.7% versus 43.5%) and an increased focus on articles that addressed service delivery for students with disabilities.

The primary areas of focus in the early 1980s were reading (23%), SPED service delivery (13.8%), and LD identification (13.8%). This focus on reading was a trend that remained present throughout the remaining years included in this analysis. Articles categorized as "other" addressed learning styles, family, and talent development in students with LD.

1985 through 1989. Seventy-six articles from this time period were included in the database (11.2%). The most frequently addressed focus area was SPED service delivery (12%). Of the articles focused on SPED service delivery, 80% addressed restructuring special education and general education classrooms and implementation of the Regular Education Initiative (REI). The REI which pushed for general education accountability and mainstreaming for students with disabilities was first recommended in 1986 (Will, 1986), and the publication of SPED service delivery articles in this time period seem to align with that proposal; 9 were published in 1986, 6 were published in 1987, and 1 was published in 1988.

SPED service delivery was followed by reading (9.2%) and transition/adulthood (9.2%). Of all 677 highly cited articles in the database, 12 addressed high school transition or adulthood topics for individuals with disabilities. Seven of those 12 articles (58.3%) were published during this decade Articles included in the other category in this

time period addressed self-concept, self-efficacy, and speech and language issues. These articles each constitute less than 1% of the total during this time period.

Topic trends in the 1990s. Of the total articles, 13.5% were published between 1990 and 1994. Of those, the largest portion addressed ADHD (11.9%). This was the only subsection of time to have ADHD articles constitute one of the top five topic areas. ADHD articles were followed by literature on LD identification (8.6%). Behavior and social emotional (7.6%), phonological awareness (7.6%), and reading (7.6%) articles each represented the next largest subsections of highly cited literature during this time. The amount of SPED service delivery articles published in the early 1990s decreased significantly (6.5% versus 12%). Within the articles categorized as "other," topics included gender, memory, quality of life, motivation, and sensory integration.

Compared to the years between 1990 and 1994, the total number of highly cited articles published between 1995 and 1999 declined slightly. Although the decline in the number of highly cited publications was very small (i.e., 2 articles), this was the only time period to have fewer published articles than the previous 5 years which met the criteria for inclusion (i.e., 100+ citations, published in select journals between 1975 and 2013). This stability in the number of publications meeting criteria across the 1990s may suggest that date of publication is not the primary mechanism for determining citation rate for a published paper. Thus a paper published in the late 1990s could have a higher citation rate than a paper published in the late 1970s. Additionally, the number of academic journals in the field of special education has increased since 1975. This

increase means there are more published articles in the field. The increase in articles overall could result in an increase in citation rates for more recently published literature.

During the latter half of the 1990s, frequently addressed topic areas included inclusion, mathematics, SPED service delivery, reading, and behavior with articles on inclusion representing the largest percentage (12.2%). This is the only time period in which inclusion articles represented more than 10% of the total; these articles made up slightly less than half of the total number of included articles on inclusion (45.3%).

Mathematics articles made up the second largest portion (11.1%), which was the highest portion of mathematics articles thus far. Behavior and social emotional articles represented 11.1% of the total during this time period, 10% focused on reading, 8.8% focused on SPED service delivery, and 8.8% focused on SPED teacher training. Of the articles categorized as "other," self-monitoring, higher order thinking, and assistive technology topics were the most prevalent.

2000 through 2004. Fewer than 20% of the articles in the database were published during this time period (n = 135). This is the largest portion of articles that met the criteria for inclusion during any 5-year period of disaggregation representing an additional 7% from the previous 5 years (13.2%) and more than double the subsequent 5 years (7% in 2005-2009). This result further supported findings that the impact of articles (i.e., how many citations they incur) is not solely a function of publication date. And while citation rate is correlated with perceptions of quality (Bursuck & Epstein, 1987), the length of time since publication may not always dictate citation rate (i.e., more

recently published papers may have amassed more citations than older papers in some case). Other factors including social and political factors, design type, or topic of the publication may also influence citation rate. Of the 12 publications with more than 500 citations in the database, half were published between 2000 and 2004; all were commentary papers on SPED service delivery topics. Figure 6 illustrates the number of articles published during each 5 year time period, including those that are potentially promising.

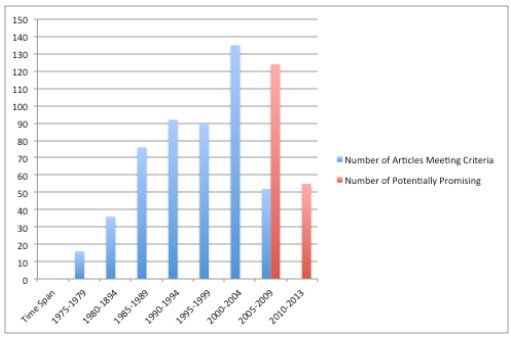


Figure 6. Number of articles published in each time period. Illustrates articles meeting criteria and those potentially promising.

During 2000-2004, articles focused on reading represented the highest portion (21.4%). This sharp increase in published reading articles may be linked to the release of the National Reading Panel Report in 2000. Second to reading articles were those that addressed behavior and social emotional topics (10.3%), mathematics (8.8%), and SPED service delivery (8.1%). Articles addressing CLD made up 5.1% of the total. Approximately 16.6% of the total CLD articles in the database were published during the early to mid-2000s.

2005 through 2009. While this time period had the total largest portion of articles, they did not all meet the 100+ citation rate needed for inclusion in the database (Figure 6). Of the 176 articles included (25.9 % of the total), 52 met the criteria of 100+ citations (7.6%). The remainder (124 articles) were included based on the graduated citation rate starting with 90+ citations in 2004 and decreasing by 10 citations each year (i.e. 80 citations in 2005, 70 citations in 2006, etc.). As a way to ensure collection of recently published articles these rates stabilized at 50 citations for 2008 through 2010 and dropped to 25 citations for articles published between 2011 and 2013. The articles included based on this graduated citation rate were considered "potentially promising" but the entire group (i.e. potentially promising and meeting criteria) was analyzed here.

Reading remained the most frequently addressed topic during this time, representing 25.5%. Mathematics was the second highest topic (11.3%) with just fewer than half all the articles addressing mathematics (44.4%). This increase in mathematics articles may be linked to The National Research Council efforts in 2001which reported on what was known about researched-based mathematics instruction in their publication *Adding It Up* (National Research Council, 2001). Also of note are articles that addressed RTI (9%), which were first seen in the database during this time.

Trends in Topic: Potentially Promising Articles: 2004 through 2013

Compared to the trends within the corpus of studies, findings change slightly when data was disaggregated across potentially promising articles. Potentially promising articles were published between 2004 and 2014 and were included based on a graduated

citation rate (i.e., 25 to 90 citations depending on the year of publication). Figure 7 illustrates the number of potentially promising articles that addressed the top 5 topic areas in the database.

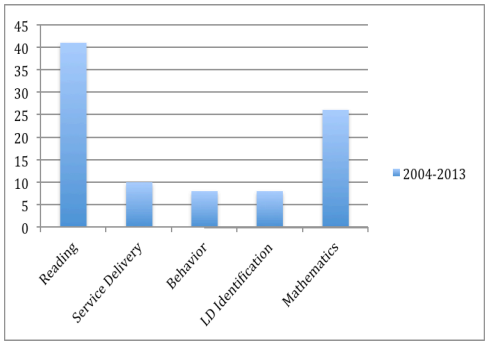


Figure 7. Potentially promising articles. Illustrates the number of potentially promising articles that address the top 5 topical areas in the database.

Of the potentially promising papers, articles that addressed reading represented the largest portion (21.1%). Of those 51 reading articles, 21 were either experimental or quasi-experimental. These studies focused primarily on effects of instructional practices including grouping, comprehension strategies, fluency and repeated reading, and vocabulary instruction. The bulk of the non-experimental articles in reading were syntheses of previous research (e.g., read aloud, spelling, and comprehension) and commentary articles.

Articles that focused on mathematics made up the second largest group at 13.4%. Many of these articles addressed number sense, problem solving, or early numeracy skills (36%). Others addressed intervention in mathematics, a topic that first appeared in 2004. Articles addressing RTI constituted 7.7% of the potentially promising literature. This is the second largest portion of RTI articles in the database. Inclusion of these articles may

reflect both policy changes (IDEA, 2004) and ongoing implementation of intervention in schools. This literature on RTI specifically addressed lessons learned in implementation, types of tiered intervention, and populations for which RTI may help (i.e., language learners, those with comorbid disabilities).

Every other topical subgroup constituted between 1% and 1.5% of the corpus of studies with the exception of CLD (5.1%) and SPED service delivery (5.1%). CLD articles primarily addressed culturally and linguistically sensitive instruction and the disproportionality of students identified for special education. Service delivery articles focused on classroom and program modifications for students with LD, peer tutoring models, and the impact of testing accommodations. Also of note is the "other" category, which constituted 19.0% of the total in this group. When further disaggregated, self-determination (4.6% of the other category) articles stood out as the largest similar subsection within the "other" category. These self-determination articles represent almost the same amount of articles within the CLD category and were identified as an important topic during this time (2004-2013).

Additionally, while 75% of the articles addressing transition/adulthood were published in the 1990s, the remaining 25% were published in the late 2000s and were considered potentially promising. Of these three transition articles, two focused specifically on post-school outcomes and employment opportunities for individuals with disabilities.

Trends in Methodology and Article Type

Patterns in article methodology (e.g., experimental, quasi-experimental, qualitative, etc.) and article type (e.g., commentary/position, descriptive, synthesis, etc.) emerged when the database was viewed in its entirety and as it was broken into 5-year time periods (see figure 8). Across the corpus of studies, commentary/position papers constituted the largest proportion (23.9%, 162 articles). Correlational studies made up 14.7% and when combined, systematic reviews of literature/synthesis and meta analyses made up 15.7% with 9.4% of that total coming from reviews of literature or syntheses and the remainder (6.3%) from meta analyses. It is important to note that while meta-analyses are rarely done without systematic methods, synthesis and systematic reviews of literature are often completed without a meta analytic component. For coding purposes these articles were identified as either meta analyses, systematic reviews (i.e., those reviews without synthesis), or synthesis of literature (i.e., systematic reviews which do not employ meta analyses). For the purposes of data analysis, however, these groups of articles were combined due to their similarities. Quasi-experimental (11.2%) and experimental (5.9%) studies made up the next largest subsection, with a combined total of 11.3%. Articles making up the smallest percentages of work in the corpus of studies were descriptive/characteristics studies with 4.7% (32 articles) and single subject designs with 2.8% (19 articles).

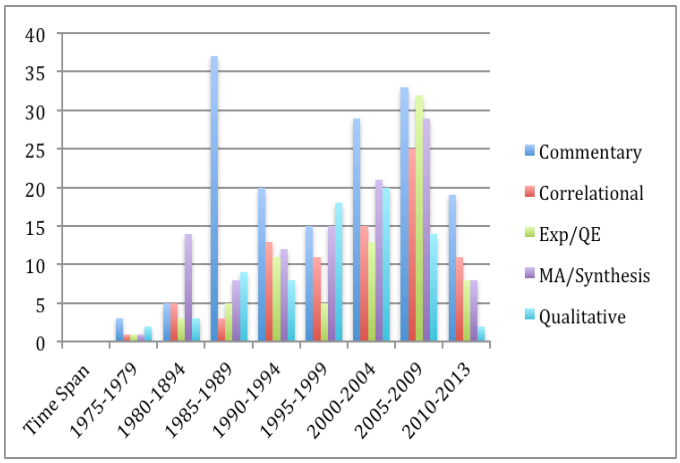


Figure 8. Top 5 article type across time. Illustrates the number of articles in the top 5 design types published across 5 year disaggregated time periods.

Methodology and Type Across Time

In the second half of the 1970s (i.e., 1975 through 1979) descriptive research constituted the largest percentage of the highly cited papers (n = 16, 27%). Highly cited descriptive research represented the 19.4% of highly cited articles between 1985 and 1989 (n = 7). However, there are no other 5-year periods where descriptive research constituted more than 1% of the publications. The second largest group represented between 1975 and 1979 was commentary and position papers (18.7%). Across the analyses, commentary and position papers made up the largest or second largest (i.e., 1975 through 2013) proportion of each 5-year period ranging between 13.8% in 1980 to 1984 (n = 5) and 48.6% in the years between 1985 and 1989 (n = 37). In the years where commentary papers made up the largest percentage (i.e., 1985 through 1989) 29.7% (n = 11) addressed SPED service delivery and were primarily focused on restructuring special education and the effectiveness of special and general education programs and 7 of those were published in 1986. Of the remaining highly cited articles

published between 1975 and 1979 there were no experimental studies, one quasi-experimental study (which addressed reading), one correlational study, and one systematic review of literature.

While there was only one highly cited systematic review of literature included between 1975 and 1979, systematic reviews, syntheses, and meta analyses made up the largest proportion of included papers published in the subsequent period between 1980 and 1984 (n = 14, 38.8%). Just over half of these systematic reviews, syntheses, and meta-analyses were categorized as "other", and they addressed primarily family issues and perspectives, learning styles, and perceptual motor skills in students with disabilities. Throughout the investigation, systematic reviews, syntheses, and meta-analyses continued to constitute between 13% and 22% of each 5 year period with the next largest percentage represented between 1985 and 1989 (n = 8, 22%), where the publications addressed assessment, SPED service delivery, and reading.

Highly cited correlational studies made up 13.8% of the total (n = 5) between 1980 and 1984 but did not constitute more than 1% of the publications in the subsequent years between 1985 and 1989. Between 1990 and 1994, highly cited correlational studies reemerged in the database with 14.1% (n = 13) studies. Of the correlational studies published during this time, 30.7% (n = 4) addressed LD identification practices. Between 2000 and 2004, 11% of the total included articles (n = 15) were highly cited correlational studies, half of which focused on topics in reading and mathematics.

In the next 5-year period (i.e., 1985 to 1989) qualitative papers represented 25% (n = 9). This was the second largest design type during this time exceeded only by commentary and position papers (n = 37). Between 1990 and 1994, the number of qualitative papers dropped significantly (8%, n = 8) followed by a significant increase between 1995 and 1999 with the inclusion of 18 articles (20% during that time). The second half of the 1990s saw the greatest number of highly cited qualitative publications. Of those, 66% (n =12) addressed SPED service delivery, inclusion, and topics ranged from the role of the paraprofessional to cultural reciprocity in the classroom

Between 1990 and 1994, 11.9% (n = 11) of the highly cited publications were experimental or quasi-experimental. This was the first time that experimental and quasi experimental studies constituted more than 6% of the articles in a 5 year time period. During the early 1990s more than half the experimental studies addressed phonological awareness and reading. The number of highly cited experimental and quasi experimental publications that met inclusion criteria (i.e., 100+ citations) dropped significantly to 5.5% (n = 5) in the second half of the 1990s. However, this number increased again in the early 2000s and peaked in the years between 2005 and 2009 where 46.1% of included highly cited studies (n = 24) were experimental or quasi experimental. Of the experimental designs published between 2005 and 2009, 19 studies addressed reading and five addressed mathematics. Remaining experimental studies addressed a variety of academic outcomes (i.e. writing, grouping practices, etc.).

The time between 1990 and 1994 was period was the first period in which longitudinal studies exceeded 3%, representing 8.6% of the total (n = 8). While the topics of these longitudinal studies varied, half of the articles addressed reading skills or teacher training and careers. In subsequent time periods, longitudinal studies represented between 5% and 10% of the total, with the highest percentage published between 2005 and 2009.

Potentially promising articles. All articles published between 2010 and 2013 were included based on a graduated citation rate of 25+ citations. This graduated rate was meant to capture the most recently published of the potentially promising articles. Commentary articles continued to represent the highest percentage of the total (n = 55; 34.5%). Among the commentary papers, slightly less than 25% addressed RTI. Correlational studies made up the second largest percentage (20%). Experimental and quasi-experimental studies and syntheses, meta-analyses, and reviews of literature each made up 14.5% of articles published between 2010 and 2013. Of the experimental studies, five addressed reading and three addressed mathematics.

Trends in Methodology and Article Type: Potentially Promising Literature

Potentially promising articles, or those included based on a graduated citation rate of 25 to 90+ citations depending on year of publication, constituted 28.6% of the total corpus of studies. Results continued to indicate that commentary/position papers made up the largest proportion of studies (22.6%) in this group. Commentary papers were followed by experimental (11.8%) and quasi-experimental (7.2%) designs, which made 19.5%, combined. This proportion (19.5%) of experimental and quasi-experimental

studies was the highest across all decades; 38 of the total 77 experimental and quasi-experimental studies were published during 2004 and 2013 and are included in the potentially promising category. Seven of the potentially promising experimental and quasi-experimental studies were published within the last 3 years (i.e., since 2011). Correlational studies made up the third largest percentage of articles in this subgroup with 17.5% followed by systematic reviews of literature, meta-analyses, and synthesis with 13.8%. Longitudinal studies made up 8.2% of the potentially promising studies. Results continue to indicate single subject design studies constituted the smallest percentage, with 2% (4 articles) present in the potentially promising articles. Of those single subject studies, only one was published after 2011.

Figure 9 provides a visual representation of the number of correlational, commentary, quasi experimental, experimental, systematic reviews, synthesis, meta-analyses, and qualitative studies included based on a graduated citation rate and classified as potentially promising.

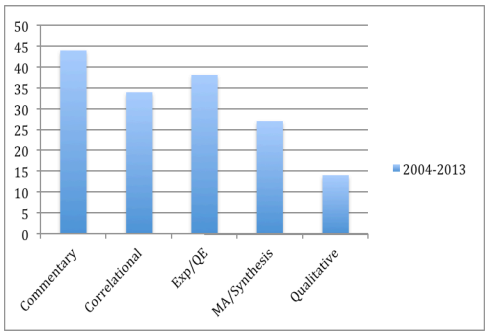


Figure 9. Design type of potentially promising articles. Illustrates the number of each article employing the most frequent design type seen across the database.

Trends in Topic Across Methodology and Design

Data was further disaggregated to explore patterns in the topic of focus (i.e., reading, math, behavior, CLD, etc.) within the five most frequently published types literature (i.e., commentary/position, correlational, experimental and quasi-experimental, systematic review, syntheses and meta-analyses, and qualitative).

Trends in Topic Area across Type

In addition to disaggregation of the topic across publications, data were also analyzed across article type and topic. These analyses indicated that patterns emerged across article types (i.e., experimental, correlational, qualitative, etc.) and the frequently addressed topics (i.e., reading, mathematics, behavior, LD identification, SPED service delivery, and CLD) of those articles. Figure 10 represents the patterns in topics across publication type and methodology.

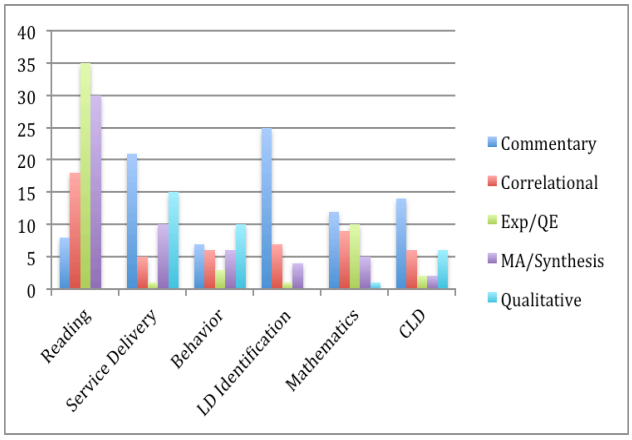


Figure 10. Article topic by design type. Illustrates the number of articles of each design type that addressed the top 5 topical areas in the database.

Trends in topics

Reading and mathematics. Reading was, by far, the most frequently addressed topic (45.4%) in the experimental and quasi-experimental studies. Mathematics was the

second most frequently addressed topic representing 12.9% of the total. When combined, articles on reading and mathematics made up 58% of the experimental and quasi-experimental studies. These studies addressed a variety of specific topics including effects of instructional practices on outcomes for students with disabilities (i.e., grouping, strategy instruction, computer assisted instruction, secondary and intensive intervention, cognitive strategy instruction, etc.) Reading was also the most frequently addressed topic in the correlational studies (18%) and the systematic reviews/syntheses (28%). Correlational studies tended to focus on environmental factors of reading disability, early intervention and risk factors, and comorbidity of mathematics and reading disabilities. Mathematics made up 9% of the correlational studies and only 4.6% of the systematic reviews/syntheses. Correlational studies in mathematics focused on predicting mathematics ability, early intervention, and skills of at-risk students. Within the qualitative studies neither mathematics nor reading constituted more than 3% of the total. Within the commentary/position papers, mathematics and reading together represented 12.9%, with 7.4% of those focused on mathematics. Commentary papers addressing mathematics focused on intervention practices and the use of evidence based practices in mathematics.

Service delivery and LD identification. SPED service delivery was the primary area of focus in the qualitative papers (19.7%) and the second highest topic represented in the commentary/position papers (12.9%) followed by LD identification with 15.4%. SPED service delivery also constituted 9.3% of the systematic reviews, which was the

second highest area of focus in that category. Within the systematic reviews, LD identification was the lowest represented topic area with 3.7% of the literature. A large percentage of service delivery papers focused on topics ranging from restructuring special education and general education classrooms to serve the needs of students with disabilities, the structure and efficacy of secondary programs in special education, and perceptions of the REI. LD identification articles focused primarily on the use of the discrepancy model, correlations between IQ testing and LD identification, and intervention as a mechanism for identification of LD.

Behavior and inclusion. Articles focused on behavior made up 13.1% of the qualitative literature and 6% of the correlational studies. Behavior articles, however, did not constitute more than 2% of any other article type. Of the total articles on inclusion (n = 24) indexed in the database, 30% were qualitative. These articles addressed student, teacher, and parent perceptions of inclusion, social outcomes of inclusion, and the structure programs to support inclusive practices. The remaining were scattered between article types and did not constitute a subsection larger than 2% in any category. Behavior and social emotional articles often focused on peer relationships, social skills, and peer perceptions of students with LD. Many addressed intervention and academic outcomes for students with LD and behavioral disabilities.

Trends in methodology

Correlational. Within the correlational studies, the largest portion addressed developmental and environmental links between early readers and reading difficulties

(44.4%). Articles that addressed measurement of reading outcomes and predicting reading success represented the second largest portion of correlational studies (22.2%) followed by investigations into links between reading difficulties and other disabilities (ADHD, behavior; 16.6%). Remaining correlational articles addressing reading made up 0.5% of the total.

Of the mathematics articles, 22.2% addressed problem solving, 33.3% addressed predicting math success in early grades (kindergarten through grade 2), and remaining articles addressed mathematics disabilities (i.e., family link, special visualization, fact retrieval).

LD Identification articles focused on data, intelligence, discrepancy, and classification of students with LD IQ and discrepancy. All correlational articles on behavior addressed social issues (i.e., social skills, social status, social and emotional understanding and self-perceptions) and 100% of the articles coded as CLD focused on disproportionality of African American students with LD, racial issues, and language learners.

Experimental and quasi-experimental. The main topics within the highly cited experimental designs were reading and mathematics. Of the studies addressing reading, nine articles addressed reading comprehension interventions or outcomes (25.7%), seven addressed early literacy or reading intervention in early grades (20%), and remaining articles each made up less than 1% of the total. Remaining articles primarily addressed

some kind of reading intervention or instruction (i.e., question generation, rapid naming, spelling, inadequate response to intervention, etc.)

The articles addressing mathematics focused on problem solving skills (40%) and early numeracy for students at-risk for mathematics disabilities (50%). Remaining articles made up approximately 10% each (1 of 10) and addressed concurrent reading and math disabilities and developing automaticity in multiplication.

Syntheses, reviews, and meta-analyses. The largest portion of this subsection of articles focused on reading, SPED service delivery, and ADHD topics. Syntheses of reading interventions outcomes made up the largest portion (43.3%). Intervention type varied but included spelling, grouping practices, graphic organizers, fluency and comprehension, read alouds, and cognitive processing (13.3%). The remaining articles made up less than 1% of the total (male vulnerability to LD in reading, memory processes in students with LD, time delay in students with severe disabilities).

SPED service delivery articles addressed co-teaching and paraprofessional support (50%), followed by peer tutoring practices (20%). Remaining articles (10% each or 1 of 10) addressed early intervention and effective schools. Of the reviews addressing ADHD, 55% focused on the effects of stimulant medication, 30% addressed self-regulation strategies, and the remaining articles looked at ADHD as a diagnostic category (2 articles).

Qualitative Studies. The qualitative studies were broken into three broad categories: behavior and social emotional, SPED service delivery, and SPED teacher

training. Of the articles focused on behavior, 60% addressed social emotional functioning (i.e., peer status, popularity, social status, and self-concept), 20% addressed 'success' in life (i.e., the life course of EBD and predictors of success in students with EBD) and the remaining articles (i.e., concomitance of EDB and LD and self-determined model of instruction) constituted 10% each.

Of the qualitative articles on SPED service delivery, 20% focused on the REI (i.e., teacher perceptions and classroom readiness to handle both students with disabilities and those without), 33% focused on co-teaching, paraprofessionals, and the role of the teacher in a push-in model. Other articles made up less than 1% of the total each. These articles addressed cultural reciprocity, reading instruction in the resource room, barriers to research, and content-area instruction in special education classrooms.

Each of the qualitative designs focused on SPED teacher training addressed teacher preparation, attrition, shortage of teachers, and alternative ways to certify teachers. Those articles that focused on inclusion addressed student and teacher perspectives (62%) and barriers to inclusive practices (38%).

Disaggregating for Students with LD

In addition to exploring the most common article topics and type, data were disaggregated to identify how frequently outcomes for students with learning disabilities were disaggregated from populations that included both students with disabilities and those without. Because of the general make-up of the database (i.e., high percentages of commentary or descriptive research where disaggregation may not typically occur), only

studies that typically disaggregated data were incorporated in this analysis (e.g., experimental or quasi-experimental, correlational, qualitative, and reviews/syntheses/meta analyses). Of those articles that disaggregated data for students specifically with LD, 22% were experimental or quasi-experimental, 21.5% were correlational, 12% qualitative, 11% were syntheses, reviews, or meta analyses, and 6.3% were descriptive.

Within the experimental and quasi-experimental studies (n = 77), 41.5% disaggregated for students with LD, 35% did not disaggregate for students with LD (i.e., samples were populations of students at-risk or struggling academically), and the remaining 23.5% employed populations of students who were all identified as having disabilities. Of the correlational papers (n = 100), 30% disaggregated for students with LD, 30% did not disaggregate for students with LD, and 30% employed populations made up entirely of students with disabilities. Fewer than twenty-percent (19.7%) of the qualitative studies did not disaggregate data for students with LD and just over 17% of the qualitative studies did specifically disaggregate for LD. Of the synthesis, reviews, and meta analyses (n= 107; 15.7% of the total), 71.9% did not disaggregate for students with disabilities, 14.9% disaggregated for students specifically with LD, and 13.4% reported on populations where all students had disabilities.

Within design type, data were further disaggregated to specially look into intervention studies. Intervention studies made up 15.8% of the total corpus of articles; of those, 28% included samples made up entirely of students with disabilities, 35.5% did not

disaggregate for students with LD, and the remaining 36.5% disaggregated LD participants from the overall study sample.

Trends in Authorship

The work of 426 authors is represented within this database of highly cited literature. This number (n = 426) was determined by accounting for first authorship across all indexed papers. Of the represented first authors, a few stood out as highly prolific. With their publications combined, eight professionals (1.8% of the total authors) were responsible for 11.3% of the work. In order of authorship (greatest to least, number of first authorship publications, see table 6) those authors are: *K. Kavale (12), D. Fuchs (11), S. Vaughn (11), H.L. Swanson (9), L. Fuchs (8), R. Gersten (8), J. Torgesen (7),* and *M. Montague (6)*. These eight professionals were selected as they represented those first authors with the highest number of first authorship roles.

Table 6.

Authors with more than 6 first authorship papers

Author	Number of First Authored Papers
K. Kavale	12
D. Fuchs	11
S. Vaughn	11
H.L. Swanson	9
L. Fuchs	9
R. Gersten	8
J. Torgesen	7
M. Montague	6

Data for first authors responsible for three through five publications were also disaggregated (Table 7). Results indicated that when these highly prolific authors (i.e.,

the eight most prolific) were combined with those professionals who acted as lead author on 3 or more articles, 22.8% of the indexed work could be accounted for. That is to say, 10.3% of the authors included in the database were responsible for 22.8% of the highly cited articles.

Table 7.

Authors with 3 or more first authored papers

Author(s)	Number of first Authored Papers
F. Gresham; J. Kilnger; R. O'Conner; K. Stanovich	5
D. Browder; T.H. Bryan; H. Catts; D. Chard; C.S. Englart; J. Fletcher; S. Graham; J. Jenkins; P. Morgan	4
P. Aaron; D. Bailey; B. Cook; M. Coyne; S. Deno; D. Deshler; C. Denton; G. DuPaul; D.C. Geary; M. Giangreco; D. Hammill; A Jitendra; D. Johnson; N. Jordan; J. Kauffman; P. Marston; J. Martin; P. McCardle; A. Paliscinar; R. Reid; P. Rourke; T. Scruggs; L. Seigel; R. Skiba; F. Vellutino; M. Wehmeyer	3

In addition to analysis of first authorship, authors were also given credit for second and third authorship roles. This analysis was conducted by assigning points to first, second, and third authors. Individuals with first authorship were assigned three points, those in second authorship were assigned two points, and those with third authorship were assigned one point. Many of the authors who had the highest levels of first authorship roles also held many roles in second and third authorship positions.

However, not all of the authors on the initial list of eight (*K. Kavale, D. Fuchs, S. Vaughn, H.L. Swanson, L. Fuchs, R. Gersten , J. Torgesen,* and *M. Montague)* maintained their position with the highest amount of points (see Table 8).

Table 8.

Highest number of scaled points for authorship roles

Author	Number of Scaled Points for Authorship Roles (20+)
S. Vaughn	69
D. Fuchs	66
L. Fuchs	57
K. Kavale	36
D. Chard	21
J. Fletcher	23
M. Mastropieri	23
D. Deshler	20

Using the point system to rank authors, 30 individuals (7% of the total) earned 10 points or more. Of those authors, nine individuals earned 20 points or more. The highest ranking authors are as follows: *S.Vaughn* (69), *D. Fuchs* (66), *L. Fuchs* (57), *K. Kavale* (36), *H.L. Swanson* (28), *J. Fletcher* (23), *M. Mastropieri* (23), *D. Chard* (21), *and D. Deshler* (20). Those authors who earned 10 points or more are indicated in Table 9.

Table 9.

Scaled points 10-20 for authorship roles

Author	Number of Scaled Points for Authorship Roles (10-20)
S. Graham; J. Klinger	18
F. Gresham; R. O'Connor; J. Torgesen	17
S. Deno; T. Scruggs	16
C. Denton; K. Stanovich	15
J. Jenkins; S. Linan-Thompson, L. Seigel	14
D. Browder	13
T.H. Bryan; H. Catts; C.S. Englart; B. Hary; M. Montague; D. Morgan; J. Yesseldyke	12
M. Wehmeyer	11

Most Frequently Cited Articles and Seminal Works

Frequently cited articles. Of the articles included in the database, 12 were cited more than 500 times (Table 10).

Table 10.

Articles cited more than 500 times

Author	Year	Count	Journal	Title	Primary Content	Article Type
Deno, S.	1985	1438	EC	Curriculum-based measurement: The emerging alternative	Assessment	Commentary
Will, M.	1986	936	EC	Educating children with learning problems: A shared responsibility	SPED Service Delivery	Commentary
Horner, R.H., Carr, E. G., Halle, J., McGee, G., Odom, S., & Wolery, M.	2005	853	EC	The use of single-subject research to identify evidence-based practice in special education	Research Methods	Commentary
Torgesen, Alexander, Wagner, Rashotte, Voeller, & Conways	2001	782	JLD	Intensive remedial instruction for children with severe reading disabilities: Immediate and long term outcomes from two instructional approaches	Reading	Longitudinal
Scruggs & Mastropieri	1996	775	EC	Teacher perceptions of mainstreaming/inclusion 1958-1995: A research synthesis	Inclusion	Synthesis
Torgesen, Wagner, & Rochette	1994	769	JLD	Longitudinal studies of phonological processing and reading	PA	Longitudinal
D. Fuchs D.& L.S. Fuchs	1994	673	EC	Inclusive schools movement and the radicalization of special education reform	Inclusion	Commentary
Fuchs D., Mock, Morgan, & Young	2003	642	LDRP	Responsiveness to intervention: Definitions, evidence, and implications for the learning disabilities construct	RTI	Commentary
Hazasi, SB., Gordon, L.R., & Roe, C.A.	1985	569	EC	Factors associated with the employment of handicapped youth exiting high school from 1979 to 1983	Transition	Longitudinal
Geary	2004	544	JLD	Mathematics and learning disabilities	Math	Commentary
Vaughn & Fuchs L.	2003	534	LDRP	Redefining learning disabilities as inadequate response to instruction: The promise and potential problems	LD Identification	Commentary
Torgesen	2000	510	LDRP	Individual differences in response to early interventions in reading: The lingering problem of treatment resisters	RTI	Commentary

Note. *EC* = Exceptional Children, *JLD* = Journal of Learning Disabilities, *LDRP* = Learning Disabilities Research & Practice; PA = Phonological Awareness; RTI = Response to Intervention, LD = Learning Disability .

Four of the most prolific authors were also responsible for the five of highest cited papers (D. Fuchs, L. Fuchs, J. Torgesen, S. Vaughn). Of the highest cited articles 66.6% were commentary papers that addressed a variety of topics including SPED service delivery, LD Identification, single subject design, reading, math and RTI. Two of the articles were longitudinal studies addressing IEP meeting processes and reading fluency and one was a synthesis addressing perceptions of mainstreaming and inclusive practices. Of the 483 articles included based on a citation rate of 100 or more, 3.9% were cited over 300 times; the remaining articles (96.1%) were cited between 100 and 200 times.

Potentially promising. Of the potentially promising articles (n = 194), those with the highest citation rates included: "Prevalence of Combined Reading and Arithmetic Disabilities" (Dirks & Spier, 2008; 98 citations), "Deconstructing Barriers and Perceptions of Students Labeled with Learning Disabilities in Higher Education" (Denhart, 2008; 93 citations), "Putting Self Determination into Practice" (Karvonen et al., 2004; 93 citations), "A National Look at Children and Families Entering Early Intervention" (Scarborough et al., 2004; 91 citations), "The Effects of Computer-Assisted Instruction on Number Combination Skill in at-risk First Graders" (Fuchs et al., 2006; 90 citations), and "Cultural Models of Transition: Latina Mothers of Young Adults with Developmental Disabilities" (Rueda et al., 2005; 90 citations).

Seminal works. Because the date range for inclusion in this investigation was set at 1975, results did not overlap with the potentially seminal works identified by Patton et al. (1989) and this database. Every article identified by Patton et al. (1989) was

published on or before 1974. Even though a variety of methods of for identifying articles (i.e., voting by university faculty, citation count and voting) were used there is some overlap between highly cited articles identified in this analysis and seminal works identified in previous investigations (McLeskey, 2004; McLeskey & Landers, 2006).

In order of citation count, these overlapping articles can be seen in table 11.

Table 11.

Overlap between previously identified seminal works and highly cited literature

Author	Year	Count	Journal	Title	Primary Content	Article Type
Deno, S.	1985	1438	EC	Curriculum-based measurement: The emerging alternative	Assessment	Commentary
Will, M.	1986	936	EC	Educating children with learning problems: A shared responsibility	SPED Service Delivery	Commentary
D. Fuchs D.& L.S. Fuchs	1994	673	EC	Inclusive schools movement and the radicalization of special education reform	Inclusion	Commentary
Hazasi, SB., Gordon, L.R., & Roe, C.A.	1985	569	EC	Factors associated with the employment of handicapped youth exiting high school from 1979 to 1983	Transition	Longitudinal
Steinback, W. & Steinback S.	1984	512	EC	A rationale for the merger of special and regular education	SPED Service Delivery	Commentary
Reynolds, M.C., Wang, M.C., & Walberg, H.J.	1987	421	EC	The necessary restructuring of special education	SPED Service Delivery	Commentary
Edgar, E.	1987	353	EC	Secondary programs in special education: Are many of them justifiable?	SPED Service Delivery	Commentary
Giangreco, M.F., Dennis, R., Cloninger, C., & Edleman, S.	1993	331	EC	I've counted Jon: Transformational experiences of teachers educating students with disabilities	SPED Teacher Training	Commentary

Note. *EC = Exceptional Children; SPED = Special Education*

Of the eight articles identified as highly cited in this database and potentially seminal or classic in previous investigations, 75% are commentary (6 articles), one article is descriptive research and one is correlational. Half of the publications address SPED service delivery in some manner (i.e., are special education programs justifiable, the restructuring of special education programs, educating students with disabilities in general education settings, etc.), while others focus on inclusion models for students with disabilities, transition, adulthood, employment issues for individuals with LD, and curriculum-based measurement methods as a way to measure academic progress. These articles were all published in *Exceptional Children* during a 10-year period between 1984 and 1994.

It is difficult to find consensus between the list of highest cited potentially promising articles and previously identified seminal works because this list of potentially promising articles may be the first of its kind in the field of LD and previous analyses (McLeskey, 2006; McLeskey 2004; Patton et al., 1989) were conducted using articles published prior to 2004. However, it is interesting to note the difference in topical area between the potentially promising articles and the highest cited articles. Potentially promising articles focused more on instructional components (i.e. computer aided instruction, early intervention, self-determination) and cultural responsiveness in special education while frequently cited articles from previous years focused on inclusion models and the general structure of special education programs.

CHAPTER 5

Citation Counting

Citation counting is an ongoing practice that started with the development of the Science Citation Index (SCI) in the 1960s by Eugene Garfield's Institute for Scientific Information. SCI was later renamed the Social Sciences Citation Index, which is now organized through Reuters and goes by the name Web of Science (Beel & Gipp, 2009). Citation counting was done manually until the late 1980s when the development of an algorithm made an automated citation count formula available. This automated algorithm allowed for the first mass scale up of citation indexing (Beel & Gipp, 2009) and to the introduction of academic search engines including Windows Live Academic, Elsevier, Scotus, CiteSeer, and Google Scholar.

After its release in 2004, Google Scholar (GS) quickly became the site of largest collection of peer-reviewed online journals in the United States (Kousha & Thelwall, 2007). As of mid-2014, researchers estimated GS held more than 160 million documents and managed citation counts for each. The relatively recent (i.e., since 2004) and scaled-up accessibility of citation count from GS made it possible for researchers and professionals in the field of LD to both identify and gauge what publications have been most commonly accessed and potentially impactful for the first time. While citation counts have been utilized for calculation of journal index factor and for identification of potentially seminal works (McLeskey, 2006) within the field of Learning Disabilities

(LD) they have not been used as a mechanism for identification of articles or content analysis.

Topic Area and Methodology

Commentary and position papers. When disaggregated by article topic and design, it became clear that the single category of commentary and position papers dominated in the field of LD (23.9% of the total database). This finding was similar to Mastropieri et al. (2009) which indicated 23.5% of the research evaluated between 1988 and 2006 were commentary, position, editorial, or rebuttal papers. In the Mastropieri et al. (2009) investigation, commentary papers came in second to articles that included novel research (54% of the papers). In this corpus of studies, a similar trend occurs. When combined, primary research articles (i.e., experimental, quasi-experimental, longitudinal, single subject, correlational, and qualitative) made up 47% of the total. However, no single category outweighed commentary papers, which represented the largest percentages across all time periods with the exception of 1995 through 1999 (where commentary papers come in second).

This phenomenon may occur for a variety of reasons. One hypothesis that may explain the high levels of commentary work has to do with the evolution of the field and the seemingly low levels of experimental and quasi-experimental design studies meeting inclusion criteria published before 2004 (Mastropieri et al., 2009). After the initial passage of PL 94-142 in 1975, many researchers began to search for consensus around how to define LD and how to include students with LD in school settings (Hallahan &

Pullen, 2013). These types of questions (i.e., how to define LD and how to include students with LD) are answered best by observational studies, qualitative research, and descriptive research. Much of the highly cited work published during the first 10 to 15 years after the passage of Pl 94-142 was dominated by this kind of research (i.e. qualitative and descriptive), which sought to define and characterize the targeted population of students with disabilities.

However, the evolution of methodology type in the highly cited literature seems to reflect that periods of characterization and definition in the research (i.e., what make students with LD different from students without LD) were often followed by an influx of position, commentary, and editorial papers (i.e., students with LD should be monitored by general education staff). This cycle may reflect the way researchers tested out hypotheses before they took a position based on the results.

One example of this phenomenon was demonstrated by changes in the highly cited publications on LD identification between the late 1980s and early 2000s. In the early 1980s and into the early 1990s half of the highly cited work (50%) on LD identification was qualitative, correlational or descriptive (i.e., IQ and LD identification, primary identifying features of LD, declaring eligibility criteria). This work was followed by an influx of commentary papers (25 articles) on LD identification starting in the late 1990s and continuing into 2013. A similar phenomenon occurs in SPED service delivery articles and reading articles and is further supported by the lack of highly cited experimental designs on these topics until the mid-2000s (i.e., all but 3 experimental

studies in reading were published after 2004). It seems as though researchers in the field were careful to define, characterize, and take a position on a topic before introducing experimental and quasi-experimental design studies to further refine the area of study.

Funding Sources. Other considerations in explaining the trends in topic and design of the highly cited literature include funding sources, calls for research, and authorship. In the late 1980s and early 1990s the federally funded research in education was organized by the Office of Educational Research and Improvement (OERI; Weiner & Cross, 2013). OERI placed emphasis on federal support for research on student motivation, higher order thinking skills, disadvantaged students, and computer-based instruction (Weiner & Cross, 2013). While coding did not include identification of funding sources .the inclusion of articles addressing self-regulation, motivation, and metacognition (which were coded as "other") may be explained by the push from OERI to focus on those topics.

In the early 2000s, the OERI was overhauled and replaced with a new institute, the Institute for Education Sciences (IES). IES was intentionally structured as a way to provide funding for research insulted from political maneuvering (Weiner & Cross, 2013). Among other things, during the early 2000s and continuing into today IES was tasked with supporting scientifically based research, a term that was also integrated into the policy of the time (i.e., NCLB and IDEA). This push to support evidence based practices and scientifically backed instruction could explain both the increase in highly cited experimental designs and intervention research articles published after 2004.

In addition to the push towards general scientific research, IES also releases a Request for Applications (RFA) each year that focuses on particular topics within education. Applications that adequately address the specific topic area of the RFA are most likely to be funded. In addition, IES established a series of innovation grants called i3 grants that support the development and scaling up of effective practices that support students with disabilities (among other things).

These competitive funding sources directly influence the topic and types of research that are possible in special education. As IES holds RCTs at a premium, additional funding has been allotted for experimental studies. This is evident in the database based on the year and amount of highly cited experimental research which makes up only about 11% of the total articles published between 1975 and 2013 but almost 20% of the potentially promising articles published between 2004 and 2013.

Authorship. Authorship may also have an impact on citation rate, topic, and type of literature. For example, 20% of the highly cited commentary papers and 22% of the experimental and quasi-experimental designs were written by one of the nine individuals identified as the most highly prolific authors in the database (e.g., S. Vaughn, D. Fuchs, L. Fuchs, K. Kavale, H. L. Swanson, J. Fletcher, M. Mastropieri, D. Chard, and D. Deshler). Citation rate tracks how often a paper is used in the field or matched within the correct tagged information in GS (Kousha & Thewall, 2007). Because many prolific authors are also commonly authors on the highest cited papers, it stands to reason that

they would continue to amass additional citation rates based on additional GS searches as initial citations breed more citations (Kousha & Thewall, 2007).

Social and Political Influences

Although it is difficult to pinpoint the exact nature of the relationship between research and policy (Gersten, 2005), findings from this content analysis suggest that research trends are often articulated by changes in policy. One example of this was reflected by two important publications from the mid 1980s: "Curriculum-Based Measurement: The Emerging Alternative" (Deno, 1985) and "Educating Children With Learning Problems: A Shared Responsibility" (Will, 1986). These articles are two of the highest cited articles in the database (1430 and 934 citations respectively) and also appear in previous investigations (McLeskey 2004; McLeskey & Landers 2006) as potentially seminal works.

Curriculum based measurement: Deno, 1985. Within the database, there were no highly cited articles on curriculum-based measurement (CBM) prior to the publication of Deno's article in 1985. Only one highly cited publication on assessment in general (i.e., standardized achievement tests in special education) was present during that time. However, in the same year of the Deno publication (1985) four other highly cited articles on CBM were published (Deshler & Schumaker, 1985; Gickling & Thompson, 1985; Marston & Magnusson; Thompson 1985). Of all the highly cited articles published in 1985, 40% addressed CBM, which represents highest proportion of assessment articles in one year. While there is no clear policy decision that preempted the publication of the

Deno 1985 article, the history of CBM in the field of special education is important to understand. Deno and Mirkin (1977) conducted initial work on CBM in the late 1970s. This work outlined how progress-monitoring data could be used to help make educational decisions for students with disabilities.

The initial CBM research was validated through a federally funded grant at the University of Minnesota and then in a comparative study by Fuchs et al. in 1984 (Deno, 1985; Fuchs et al., 19984.). By the time Deno published "Curriculum-Based Measurement: An Emerging Alternative" in 1985, the field was steadily looking for a valid system of progress monitoring that could be used in special education resource rooms (Deno, 1985). This may explain the increase in publications during 1985 and the consistent publication of highly cited articles on assessment topics thereafter.

Regular education initiative: Will, 1986. Shortly after the Deno publication in 1985, Madeline Will, the then-assistant secretary for the Office of Special Education and Rehabilitation Services under the United States Department of Education, published an annual report on the status of special education. In the report, Will proposed implementation of the Regular Education Initiative (REI), which addressed concerns regarding the effects of pull-out type programs on the educational outcomes for students with disabilities (Will, 1986). In "Educating Children with Learning Problems: A Shared Responsibility", Will proposed mainstreaming students with disabilities into the general education classroom as a mechanism to detract from the negative outcomes of pull-out programs (Will, 1986).

The proposal of the REI is very evident in the highly cited publications starting in the late 1980s. In 1986 alone there were seven highly cited commentary papers that addressed special education service delivery (Deci & Chandler, 1986; Delquadri et al., 1986; Deshler et al., 1986; Gersten et al., 1986; Johnson & Johnson, 1986; Palinscar, 1986; Will, 1986). These commentaries made up one-third of the highly cited publications that year. In total, 21 commentaries on special education service delivery were included in the database of highly cited articles and of those 66% (14 articles) were published between 1986 and 1990. The publication of articles addressing REI may have subsequently impacted the kind of attention that was paid to inclusion and special education teacher training. Within the database there are no articles on inclusion published between 1986 and 1990, however between 1992 and 1998 there are 15 articles (68% of the total on inclusion) addressing teacher perspectives on inclusive practices, lessons learned, observation studies of inclusion, and the heavily cited Fuchs and Fuchs (1994) commentary on the inclusive schools movement and the radicalization of special education.

Education policy: 2000-2008

Other policy changes that seem to have impacted the topic and design of the research include the National Reading Panel Report (NRP, 2000), the National Research Council report on mathematics instruction (2001), the No Child Left Behind Act (NCLB, 2002), the reauthorization of the Individuals with Disabilities Education Act (IDEA, 2004), and the National Mathematics Advisory Panel (NMAP, 2008). By influencing

how researchers and practitioners look at academics, behavior, inclusion practices, assessment, and accountability these policy changes provided the impetus for closer inspection and seem to be reflected in the highly-cited literature.

National Reading Panel. In 1997, the United States Congress was tasked to work with the Department of Education in creating a panel of reading experts to evaluate extant research and to suggest evidence-based methods for teaching reading (NIH, 2004). The result of this call was the publication of the National Reading Panel (NRP) report in 2000. The report suggested high quality reading instruction would include explicit instruction in phonemic awareness, systematic phonics instruction, fluency practice, and incorporation of comprehension strategies (NRP, 2000). Prior to the publication of this report, 35 highly cited articles on reading and phonemic awareness were published. That is, 26% of the total articles on reading or phonemic awareness were published in the first 25 years. However, following the publication of this report, the number of reading articles increases greatly. In 2000, 10 highly cited articles on reading were published and the remaining 74% were published during subsequent years. Between 2001 and 2013 the number of published reading articles ranged between six and 12 each year.

After the release of the NRP report, experimental studies in reading also increased significantly. Starting in 2003, 16 of the 20 (80% of the total) highly cited experimental studies in reading were published. These studies range in specific topic (i.e., comprehension, summarization, peer-assisted reading, fluency, question generation etc.) but all address the impacts of evidence-based practice on reading instruction for students

across kindergarten through 12th grade. This increase could also reflect the push by IES to fund gold standard experimental design studies.

National Council of Teachers of Mathematics and NMAP. Articles on mathematics play a minor role in the highly cited literature on LD until the year 2000 when they show an increased presence. Prior to 2000, mathematics articles constituted less than 5% of the publications in any 5-year period. This was followed by a jump to 8% between 2000 and 2004 and 11% between 2005 and 2009. Mathematics articles make up 13% of the potentially promising literature. This increase in focus on mathematics may be in part due to the NCTM standards, which when implemented were the first national expectations in mathematics. The NMAP report, which was released as a counterpart to the NRP report, and the National Research Council report *Adding it Up* provided recommendations for researched-based mathematics instruction. These documents suggested that instructional practice in mathematics should include high quality, student-centered practice and should emphasize early mathematics instruction, and efforts to reinforce automaticity, conceptual, and procedural fluency (NMAP, 2008). These recommendations are reflected in the highly cited mathematics literature, especially in the focus on problem solving, early numeracy, and supporting at-risk students in early grades.

NCLB and IDEA. The enactment of two federal policies in the early 2000s also seemingly impacted the amount and focus of the highly cited research in LD. NCLB (2002) placed increased importance on school accountability measures and high stakes

testing for all students, including those with disabilities (NCLB, 2002) and IDEA (2004) included state regulations that moved LD identification models away from the use of discrepancy and towards the use of Response to Intervention (RTI) models. The use of the term 'evidence-based practice' becomes quite frequent in articles included in the database after the year 2002, which makes sense considering the implementation of NCLB and the IES focus on this topic. Also, while it is not surprising, all articles addressing RTI models in the database were published after 2002. One of the most highly cited articles (642 citations) in the corpus of studies was published on RTI in 2003: "Responsiveness to Intervention: Definitions, Evidence and Implications for the Learning Disabilities Construct", which seems to be a direct result of the changes in policy that include use of RTI in schools for the first time.

Seminal and Potentially Promising Publications

In their analyses of seminal works in the field of special education authors (McLeskey 2004; McLeskey & Landers 2006) used citation count and professional recommendations as a mean to identify lists of potential classic articles in the field. Faculty with various specialties (e.g., learning disabilities, intellectual disabilities, cultural issues, etc.) at doctoral granting institutions in the United States then voted on the lists, identifying which articles they deemed as "classic" in their field. McLeskey & Landers (2006) then identified a list of 12 articles as potentially classic. Half of the identified classic articles were included in the highly cited database for this investigation (table 13). Approximately 60% of the articles on the McLeskey and Landers list (2006)

were identified as classics by professionals whose specific focus was LD. Those articles include Deno (1985), Edgar (1987), Reynolds et al. (1987), and Will (1986). Additionally, two articles from the McLeskey 2004 investigation overlapped with this content analysis: Fuchs et al. (1994) and Giangreco (1993). Because they have been identified in multiple studies using a variety of methods and inclusion criteria, these articles may provide the foundation for a potential list of seminal works in the field of LD.

When potentially promising articles from this database were compared with findings from previous investigations into seminal works (McLeskey, 2004; McLeskey & Landers, 2006; Patton, et al., 1989) little consensus was reached. While McLeskey (2006) was the only author to consider citation rate in the study of seminal works, he did so as a mechanism to identify a body of articles that would be voted on as potentially classic. Because no previous investigations into seminal works looked at recently published articles (i.e. 2004 and current), it is difficult to accurately compare the findings from this work with previous analyses.

It is interesting to note that of those articles identified in table 13 as potentially seminal and highly cited, two-thirds were commentary papers addressing service delivery models for students with disabilities. This small subsection of impactful papers aligned with the bulk of the publications throughout the database (29% of the total are commentary) and demonstrates that commentary articles on service delivery were not

only popular and potentially impactful throughout the last 38 years, but they were also some of the most commonly published, accessed, and cited by professionals.

The topics and methods addressed in the highly cited, potentially seminal articles differ considerably from those in the highest-cited potentially promising articles. The potentially promising articles address a variety of topics including mathematics skills in at risk learners, concurrent math and reading difficulties, cultural and family factors for students with developmental disabilities, early intervention, and self-determination. Designs include commentary, correlational, meta-analysis, and experimental studies and when compared to each other they are far less similar to those in the seminal category. Although it is difficult to tell exactly what kind of impact these potentially promising articles may have in the future, the content and designs of these articles may reflect an evolution in the field of LD away from commentary on service delivery towards experimental and correlational studies focused on instruction for students with disabilities.

Conclusion & Summary

This content analysis revealed patterns in topic (i.e., a high proportion of reading articles), article type (i.e., commentary and position papers represent the highest proportion of the highly cited literature over the last 38 years), and in the way populations of students with LD are disaggregated for across study designs (i.e., increase in students labeled as at-risk or struggling and a decrease in disaggregation for samples of students with LD across all types of publications). Additionally, trends in topic and type may be

explained by, or may explain shifts in educational policies. One example of this was observed by the increase in highly cited articles addressing SPED service delivery, inclusion, and SPED teacher training which emerged directly after the REI was proposed in the 1986 article "Educating Children with Learning Problems: A Shared Responsibility" (Will, 1986). Other examples included increased articles in reading after the National Reading Panel report (NRP, 2000) and the increased focus on SPED service delivery after the reauthorization of IDEA in 2002.

Trends in authorship revealed that a relatively small proportion of professionals were responsible for a large proportion of the highly cited articles (i.e., 8 authors were responsible for first authorship of 22.8% of the work) and that many of those individuals also served as second or third author on the papers meeting inclusion criteria (see table 9). Results indicated a set of potentially seminal articles in the field, based on overlap between this analysis and previous analyses (McLeskey, 2006; McLeskey & Landers, 2004; Patton, et al., 1989) as well as a set of potentially promising articles to watch for future impact.

These findings are important as they indicate topics, designs, and disaggregation trends in publications that have been deemed as impactful (i.e., based on citation rate) or important by the researchers and professionals who access them. These trends point not only to patterns in the published literature on LD, but also indicate areas of focus where research topic and type have changed (i.e., the decline in teacher training articles, the increase in experimental designs) and potential areas of focus for research moving

forward. These areas may include an increased focus in academic areas other than reading (i.e., mathematics and writing), increased focus on content-area instruction, and additional research into the impacts of SPED teacher training and support.

Limitations

Errors in citation rate. Automated citation indexing is not a perfect science. Google scholar is said to have an error rate of 10% (Beel & Gipp, 2009). Based on the way citation counting occurs (i.e., matches are found in tagged information between research articles including journal, author, year, title, volume, and page number creating a citation) it is possible to both under and over estimate the number of citations papers have actually amassed.

In addition, the automatic scaling-up of citation counting allows for a potential lack of screening for quality. Currently, it is not possible to identify where individual citations come from, just that their tagged information matches within a database. Databases such as the Web of Science account for this potential lack of quality by allowing only citation matches from other journals housed within the database. However, limiting citations to only journals within the database excludes many other citations (i.e., *Learning Disability Research and Practice* is not housed in WOS, so citations from that journal are not counted) and results in much more conservative counts compared to databases like GS where all citation matches are counted. Unfortunately however, citation counts in GS include citations from all sources (i.e., speeches, presentations,

lectures), which may allow for a more liberal count than truly accurate and do not reflect use only by the scientific community.

Matthew effect. When a GS search is conducted the results are presented based heavily on citation rank. For example, frequently cited papers appear in top positions in search results while new papers or those with fewer citations may appear on subsequent pages. This results in heavily cited papers potentially earning additional citations that in turn results in additional attention, citations, and search placement for these same papers. This phenomenon creates amassed gains in citation count for popular papers similar to a Matthew effect and may skew the true impact of those papers which have very high citation rates by making them readily accessible in a quick GS search.

Realized impact or potential impact. It is also important to consider realized currently available does not provide researchers with information regarding how quickly citations amassed (i.e., was one paper cited 20 times a year over a few years and then never again or was it cited a couple times a year over many years?), how often a paper is actually used, or if an article gained popularity quickly and was then rarely used again. By including literature based on a threshold of 100 or more citations for older publications it is possible that we have introduced bias towards articles, which may or may not have had a realized impact on the field.

Citation count and replication. Inherently, citation counts change over time. This paper presents an investigation into the highly cited literature based on search results from a set point in time. If this search were to be replicated today with identical criteria

for inclusion the results would potentially include different literature (i.e., those that had not reached 100 citations at the time of this search) and different citation counts (i.e., higher citation counts for those that were included based on the passage of time). Additionally, if this search were replicated, the articles included as potentially promising may have reached the 100+ citation rate and would be included based on the highly cited criteria (rather than based on a graduated rate). Additionally, those meeting the graduated rate may not meet the criteria any longer.

Future Research

Future analysis into this database of highly cited articles could reveal interesting trends in the published literature. Future analysis could include specifically addressing the trends in topic area and design of within intervention research and outcomes of interventions for students with disabilities in the highly cited literature. Other analyses could include further disaggregation of the article methodologies and outcomes for publications that include only populations of students LD, regression analysis on topical areas of coverage, and developing a preliminary list of potentially seminal works in the field of LD (based on citation rate).

Additionally, analysis of the potentially promising articles could involve a study of citation rate over time that includes data over a 3 month, 6, month, 9 month, 1- and 2-year periods, etc. This study of potentially promising articles could potentially identify the rate of citation count increase over time and could result in additional results

regarding what recently published articles have impact in the field and how frequently they are cited and would be the first of its kind.

Appendix A:

LD Focused Content Analyses 1975-2013

Investigation	Journals/ Years	Inclusion Criteria	Objectives	Findings
Bursuck & Epstein, 1987	*LDQ, JLD* 1984	All articles reviewed Editorials, letters to editor, continuing serials, in-brief papers, book and test reviews were excluded 126 Articles	Report on a views of leading professionals in LD Review articles published in LD journals to determine the issues addressed	• Assessment and remediation of academic difficulties (+25%), Assessment and social skills (10%), Screening and ID (7%), cognitive skills (7%), programming for adolescents with LD (7%), defining LD (7%) • Data-based (83%), Intervention research (27%)
Heath, Toste, & Rogers 2007	*JLD, LDQ, LDRP* 1996-2006	All Publications 1,077 articles	Identify: (a) areas of LD research that have the highest percentage of publications, (b) identify difference in publication topics across journals, (c) identify publication areas that have greatest growth	• 69 specific research categories • Five most published categories: reading processes and instruction (20.07%), Math processes and instruction (8.49%), Identification and diagnoses (6.9%), ADHD (4.61%), cognition and LD (4.45%) • Greatest growth: ELL, RTI, Assessment and diagnosis, Reflections on LD, and Math
Lesson, Dudzinski, Karsh, & Van Acker, 1989	*JLD, LDQ, EC, ETC, EEQ, RASE, JSE, LDR, LDF* 1978-1987	Data-based articles focused on school-age children with LD 119 Articles	Determine: (a) the amount of intervention research published, (b) articles including critical intervention components, (c) under and un-researched areas in intervention studies, (d) recommendations for potential necessary critical components in intervention research	• Lack of consensus about identification criteria of LD • Within the Intervention research: Studies introducing academic interventions (78%), studies providing individualized instruction (58%), studies providing a rationale for the intervention (64%), studies including maintenance and generalization (33%)
Mastropieri et al., 2009	*EC, JSE, RASE, JSET, ETC, LDRP, JLD, LDQ, BD, JEBD, ETDD* 1988-2006	All Publications 6,724 articles	Provide and analysis of what has been published over time Identify: (a) amount and type of research published (b) trends in publication type	• Research articles (58%), Position papers, editorials, commentary, or rebuttal (23.5%), Reviews (12%), Practical papers (4.5%) • Descriptive research (24.1%), Intervention research K-12 (15.9%), Qualitative (8.6%), Case Study (6.4%), Intervention research outside K-12 (3.1%)
McFarland, Williams, & Miciak, 2013	*JLD, LDQ, LDRP* 2001-2010	All publications 841 articles	Determine: (a) What types of articles are published, (b) How much empirical research was reported, (c) What types of	• Top topics of interest: literacy (31.9%), Non-academic (23.3%), ID processes (1.9%) • Population of interest: LD (56.5%), Low Achievers (11.4%),

			research are reported, (d) What general topics were investigated, (e) What age/ grade levels were studied, (f) What labels were used to describe participants, (g) What trends were evident over time	Elementary (45.3%), Secondary (14.9%) • 20% Intervention Studies • 67.6% Empirical studies
Vostal, Hughes, Ruhl, Benedek-Wood, & Dexter, 2008	*LDRP* 1991-2007	All publications 423 articles	Determine: (a) prevalent topics, (b) balance between research articles, surveys, program evaluation, and other content, (c) types of research methodologies and designs, (d) the populations of interest in intervention research, (e) who is delivering interventions	• Most frequent topics: Reading (18%), Assessment and identification (16%), Inclusion (11%), Psychosocial (10%)** • Types of research: Descriptive (46%), Intervention (35%), Survey (11%), Program Eval (8%) • Research Designs: Quasi-experimental (46%), Single-Subject (22%), Qualitative (16%), Randomized Trial (16%) • Areas of academic research: Reading (47%), Math (24%), Writing (17%), Content Area (8%), Spelling (4%)

Note. Nonacademic = characteristics of participants not directly related to academic areas and includes social/behavioral ** see article for additional topics EC = Exceptional Children, JLD = Journal of Learning Disabilities, LDQ = Learning Disability Quarterly, LDRP = Learning Disabilities Research & Practice, JSE = Journal of Special Education, RASE = Remedial and Special Education, JSET = Journal of Special Education Technology, EEQ = Exceptional Education Quarterly, ETC = Education and Treatment of Children, BD = Behavioral Disorders, JEBD = Journal of Emotional and Behavioral Disabilities, ETDD = Education and Training in Developmental Disabilities, LDR = Learning Disability Research, LDF = Learning Disabilities Focus

Appendix B:

Seminal Works in Special Education 1975-2013

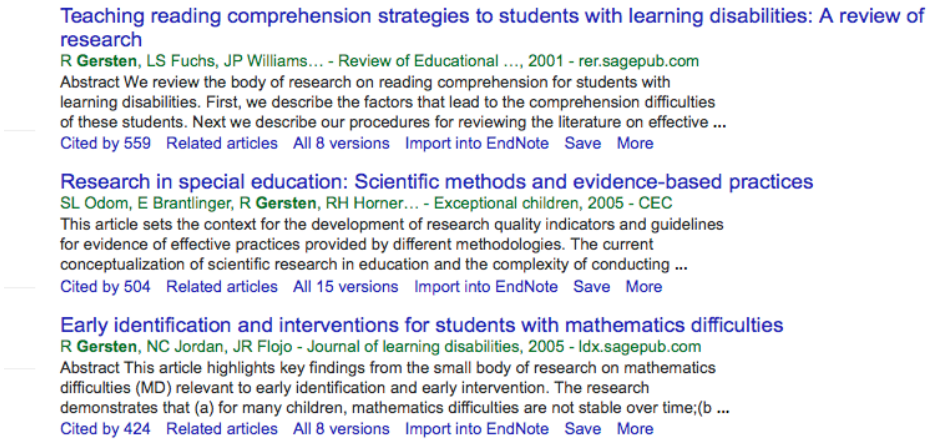
Investigation	Journals/ Years	Inclusion Criteria	Objectives	Findings
McLeskey, 2004	EC, RASE, JSE 1960-1996	Citation rates 40-60+ depending on year 50 Articles	Identify prominent journal publications in Special Education	• Highest cited articles published in EC (76%), JSE (16%), RASE (8%) • Articles balanced across decades 1970s-1900s, 1960s resulted in fewer articles with high citation rates • Content: School reform/mainstreaming (40%), Assessment and classification (20%), Other 40% • Most frequently cited: Dunn (1968), Kirk & Bateman (1962), O'Leary & Becker (1967), Keogh & Becker (1973), Brown et al., (1979)
McLeskey & Landers, 2006	EC, RASE, JSE 1960-1989	Citation rates 60-90+ depending on year published Survey of professional judgment 36 articles	Identify 'classic' articles in special education	• Five most frequently selected articles with highest citations: Dunn (1968), Will (1986), Stainback & Stainback (1984), Kirk & Bateman (1962), Deno (1985) • Five most frequently cited and highest ranked articles were chosen by faculty across expertise areas
Patton, Polloway, & Epstein, 1989	Open-ended survey response, material based on professional judgment	Survey of 124 professionals	Determine what articles across content were deemed to be influential (professional judgment)	• Little consensus amongst participants to identify 'seminal' data-based papers • Top 5 frequently chosen research reviews/position papers: Dunn (1968), Hammill & Larsen (1974), Baer, Wolf, & Risley (1968), Stokes & Baer (1977), Deno (1970), Lilly (1970)*
Swanson, Plank & Still, 1988	Journals indexed in SSCI 1966-1986	(1) Index all articles with 'Special Education' in the title (2) ID prolific primary authors (3) Tabulate citations (5+) (4) ID non-prolific primary authors for comparison 36 primary articles	Identify prominent journal publications in Special Education	• Frequency of citations for highly ranked articles ranged from 5-269 (M = 23.33, SD = 45.14) • Mean citation by primary author = 19.4 (SD = 21.90) • Highest citations published in EC (58.3%), JSE (16.6%) and JSP (8.3%) • Content of data-based articles: Program efficiency (33.3%), Instructional issues (11.1%), Assessment (11.1%), Roles/Teacher Prep (11.1%), Labeling (8.3%), Trends (8.3%), Placement (5.5%),

	25 comparison articles	General research (5.5%), Parent Involvement (2.7%)

Note. SSCI = Social Sciences Citation Index, EC = Exceptional Children, RASE = Remedial and Special Education, JSE = Journal of Special Education

Note. Deno (1970) and Lilly (1970) were rated equally amongst professionals

Appendix C:
Screen Shot of Search



Teaching reading comprehension strategies to students with learning disabilities: A review of research
R **Gersten**, LS Fuchs, JP Williams… - Review of Educational …, 2001 - rer.sagepub.com
Abstract We review the body of research on reading comprehension for students with learning disabilities. First, we describe the factors that lead to the comprehension difficulties of these students. Next we describe our procedures for reviewing the literature on effective ...
Cited by 559 Related articles All 8 versions Import into EndNote Save More

Research in special education: Scientific methods and evidence-based practices
SL Odom, E Brantlinger, R **Gersten**, RH Horner… - Exceptional children, 2005 - CEC
This article sets the context for the development of research quality indicators and guidelines for evidence of effective practices provided by different methodologies. The current conceptualization of scientific research in education and the complexity of conducting ...
Cited by 504 Related articles All 15 versions Import into EndNote Save More

Early identification and interventions for students with mathematics difficulties
R **Gersten**, NC Jordan, JR Flojo - Journal of learning disabilities, 2005 - ldx.sagepub.com
Abstract This article highlights key findings from the small body of research on mathematics difficulties (MD) relevant to early identification and early intervention. The research demonstrates that (a) for many children, mathematics difficulties are not stable over time;(b ...
Cited by 424 Related articles All 8 versions Import into EndNote Save More

Appendix D:
Code Sheet

Arden

Trends & Issues Code Sheet

Author: Wong, B.Y. & Jones, W. Year: 1982

Journal/publication source: Learning Disability Quarterly

Study origin: US

Title: Increasing metacomprehension in learning-disabled

Primary Content: Reading

Secondary Content: None

Article/design type: Systematic Review of Literature

Grades: Other 6-9 Ages:

Are participants with disabilities disaggregated? Yes

Disability category (check all that apply):

- [x] Learning disability
- [ ] Vision impairment
- [ ] Cognitive impairment
- [ ] Autism/Asperberger's
- [ ] Hearing impairment
- [ ] TBI
- [ ] EBD
- [ ] OHI
- [ ] Speech/language impairment
- [ ] Other

Intervention study: Yes

Notes:

GLOSSARY OF TERMS

Types of Research:

Descriptive/Characteristics Research: A type of research that is used to describe or provide answers to 'what' questions about the characteristics of a given population, situation, or phenomenon. For example, descriptive research might be used to answer questions about what characteristics differ between students with learning disabilities and students without learning disabilities.

Systematic Review of Literature: A structured review that intends to identify and appraise extent scholarly literature on a selected topic or focus. Systematic reviews often aim to integrate and connect finding from previous, provide a critique of previous literature, and identify central issues in a field. These types of reviews are conducted in a systematic nature and include set inclusion and exclusion criteria, coding mechanisms and reliability among other features. They do not, however, include synthesized research outcomes.

Synthesis: A structured review that intends to identify and appraise extent scholarly literature on a selected topic or focus. Syntheses aim to integrate and connect research outcomes and findings, provide a critique of previous literature, and identify central issues in a field. They are conducted in a highly systematic manner that includes set inclusion and exclusion criteria, coding mechanisms, and reliability, among other features and provide synthesized outcomes and conclusions based on the synthesized findings.

Meta-Analysis: A highly structured analyses that intends to identify and appraise extent scholarly literature on a selected topic or focus. Meta-analyses aim to integrate and connect large groups of very similar research outcomes and findings, provide critiques, identify central issues, and analyze the comparability between studies in a given field. Meta analyses are conducted in a highly systematic manner that includes set inclusion and exclusion criteria, coding mechanisms, indexing, reliability, and the provision of synthesized outcomes and conclusions based on the comparability between analyzed studies.

Correlational Research: Research that seeks to identify statistical relationships between independent and dependent variables in an experiment. For example, correlational research may seek to answer questions about the potential connection between children who grow up in poverty and their ability to learn early reading skills.

Experimental and Quasi-Experimental Research: Studies that use orderly, systematic procedures (i.e., randomization, control groups, independent and dependent variables, internal validity, and external validity) for establishing the effect of one variable on another. True experimental studies include total randomization of participants; quasi-experimental designs may involve less intensive or pure randomization (i.e., participants are randomized to a treatment based on a pre-determined characteristic). An example of experimental and quasi-experimental studies might include addressing a hypothesis that a given reading intervention impacts a struggling student's ability to read text at grade level.

Single Case Designs: Single case, or single subject, designs are experiments where individual participants act as their own control group after implementation of some sort of intervention. This type of design is primarily used to evaluate the effectiveness of interventions on some kind of behavior. One example may

include tracking how often a person eats a candy bar after they have had a diet soda and then tracking how often they eat candy bars when they are no longer allowed to have diet soda.

Longitudinal Research: This type of research involves correlational studies conducted over long periods of time. This research is often used to study phenomena or events that occur over the life span and they are often observational in nature. One example might be following a group of students identified at learning disabled throughout their formal academic career to look for patterns in maladaptive behaviors.

Qualitative Research: This research seeks to answer the 'how' and 'why' questions traditionally asked by social scientists. Qualitative research methods often involve observations of and interviews with participants and triangulation (i.e., agreement between observers or interviewers) of data. One example of qualitative research might include observing students as they learn to read and comparing the observational data with interviews of the same students on how they think they learn to read.

Commentary/Position Papers: Literature that presents an opinion on an issue or phenomenon. Commentary or position papers are often in response to policy changes, previous research papers, or policy briefs. While commentary and position papers present an opinion, they generally include data to support their claims.

Primary Content/Topics of Research:

LD Identification: Literature addressing the identification of students with learning disabilities that often addresses the discrepancy model, intelligence testing, labeling or disability categorization, and alternative models for identification.

Response to Intervention: Literature addressing tiered intervention systems intended to provide increasingly intensive and individualized interventions as a mechanism to both prevent and identify students with learning disabilities.

Cultural and Linguistic Diversity: Literature addressing a variety of topics generally focused on race, power, ethnicity, language diversity, socio-economic status, culturally responsive classrooms and instruction, and disproportionality in the field of special education.

Transition: Literature addressing the services provided to students with disabilities who move from one grade level to the next, specifically from middle school or junior high to high school and out of high school. Transition topics also generally cover students who receive special education services after high school and into post secondary education.

Self-Determination: Literature addressing the concept or phenomenon of students with disabilities acting as a participant in the decision making process about their services, supports, education, and life choices. Self-determination is often discussed in conjunction with individual education plans for students with disabilities as well as during times of educational transition.

Special Education Service Delivery: Literature addressing the structure of special education classrooms including resource rooms, self-contained classrooms, peer tutoring methods, instructional strategies (i.e., cross grade level grouping) , the use of para-professionals, co-teaching, and push-in teaching models.

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